

Off: 040-27616330  
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## HINDI MAHAVIDYALAYA

(NAAC REACCREDITED AND AUTONOMOUS)  
(Affiliated to Osmania University)  
Nallakunta, Hyderabad – 500 044



Website : [www.hindimahavidyalaya.org](http://www.hindimahavidyalaya.org)

E-Mail: [info@hindimahavidyalaya.org](mailto:info@hindimahavidyalaya.org)

## DEPARTMENT OF ENGLISH

### COURSE OUTCOMES

**B.A./B.Com/B.Sc/B.B.A**

**BA/BC/BS/BB - 102**

**SEMESTER - I**

**ENGLISH - I**

CO1	Enhance language through a task-based & learner – centric syllabus
CO2	Familiarize with various aspects of our new state of Telangana
CO3	Carry out all the LSRW skills
CO4	They learn the structure of a full length play and one act play, the dramatic devices and analyze the effect it creates in the audience.
CO5	Learn good English to prosper in professional and personal lives

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## DEPARTMENT OF ENGLISH

### COURSE OUTCOMES

**B.A./B.Com/B.Sc/B.B.A**

**BA/BC/BS/BB - 202**

**SEMESTER-II**

**ENGLISH – II**

CO1	Enhance language through a task-based & learner – centric syllabus
CO2	Analyze the various elements of poetry, such as diction, tone, form, genre, imagery, figures of speech, symbolism, theme, etc.
CO3	Students understand the process of communicating and interpreting human experience through literary representation; and in doing so they develop reading, writing and analytical skills, esp. in the English language.
CO4	They become well acquainted with the literary genre of Drama. The rhetorical aspect of drama help them understand how to represent their experience and ideas critically, creatively, and persuasively through the medium of language.
CO5	Become proficient in English for global competency

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## DEPARTMENT OF ENGLISH

### COURSE OUTCOMES

**B.A./B.Com/B.Sc/B.B.A**

**BA/BC/BS/BB - 303**

**SEMESTER-III**

**ENGLISH – III**

CO1	The students of General English Semester 3 Course learn the use rather than usage of English. Identify and use the figures of speech.
CO2	They develop their critical thinking capabilities focused through the course as an important need.
CO3	They become aware of the varieties of English through inputs in British and American Vocabulary. They are also exposed to different literary genres of prose and poetry.
CO4	The students learn/are equipped with the practical, emotional, intellectual and creative aspects of language by integrating knowledge and skills.
CO5	Learn good English to prosper in professional and personal lives. Develop their own creativity . Enhance their writing skills.

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## DEPARTMENT OF ENGLISH

### COURSE OUTCOMES

**B.A./B.Com/B.Sc/B.B.A**

**BA/BC/BS/BB - 403**

**SEMESTER-IV**

**ENGLISH – IV**

CO1	The text focuses on readability, reachability and testability Develop their critical thinking skills
CO2	The exercises and the pre & post reading activities in the text draw the student into the book and make them to read it with understanding and insight and also encourage them to think beyond the text.
CO3	The students gain ample practice in writing skills. They can write essays and reports and differentiate between objective and subjective writing.
CO4	They become aware of the varieties of English through inputs in British and American Vocabulary. They are also exposed to different literary genres of prose and poetry.
CO 5	Broaden their vocabularies and to develop an appreciation of language



# తెలుగు విభాగము

## తెలుగువిభాగము (DEPARTMENT OF TELUGU)

### విద్యార్థులు పొందగలిగే అవకాశాలు (PROGRAMME OUTCOMES)

- విద్యార్థినీవిద్యార్థులకు భాషా సామర్థ్యాన్ని పెంచటానికి తెలుగు కోర్స్ ఉపయోగపడుతుంది. అంతే కాకుండా -
- భాషావేత్తలుగా తెలుగు భాషను పరిశోధించటానికి
- భాషాశాస్త్రానికి సంబంధించి ఉన్నత చదువులు అభ్యసించటానికి
- తెలుగును మాట్లాడే ప్రాంతాలలో ఇతరులతో సంభాషించటానికి
- ఇతర భాషావిషయాలను తెలుగులో అనువదించటానికి
- తెలుగు భాషా రచయితలుగా రాణించటానికి
- కవులుగా భాష ఔన్నత్యాన్ని పెంచటానికి
- పాత్రికేయులుగా, ఉపాధ్యాయులుగా సేవలందించటానికి
- తెలుగును మాతృభాషగా కలిగిన విద్యార్థులు శాస్త్ర, సాంకేతిక విషయాలను తెలుగులో చదవటం వలన సులభంగా అనేక విషయాలను తెలుసుకోవటానికి ఉపయోగపడుతుంది.

# తెలుగు విభాగము

## తెలుగులో పట్టభద్రులైన విద్యార్థులు పొందగలిగే ప్రత్యేక అవకాశాలు SPECIFIC PROGRAM OUTCOMES FOR DEGREE TELUGU

- అనేక చారిత్రక, సామాజిక, సాంస్కృతిక అంశాలకు సంబంధించిన విలువైన విషయాలను తెలుసుకోవచ్చు.
- ప్రాచీన గ్రంథాలలో చెప్పబడిన విషయాలను తెలుసుకోవచ్చు.
- ఆ విధంగా తెలుసుకొన్న విషయాలతో మానవ భవిష్యత్తును అత్యుత్తమంగా తీర్చిదిద్దుకోవచ్చు.

# తెలుగు విభాగము

## మొదటి సెమిస్టర్

మొదటి సెమిస్టర్ పూర్తి అయిన తర్వాత స్టూడెంట్స్ ఈ క్రింది విషయాలలో అవగాహన కలిగి ఉంటారు—

### ప్రాచీన కవిత్వం

- శకుంతలోపాఖ్యానం
- గొడగూచి కథ
- సంవరణుడి తపస్సు

### ఆధునిక కవిత్వం

- కాసులు
- రాజు - కవి
- గంగిరెడ్డి
- జయభేరి

### ఉపవాచకం

రుద్రమదేవి

### వ్యాకరణం

(పర్యాయపదాలు, నానార్థాలు, సంధులు, సమాసాలు, తెలుగువాక్యం)

# తెలుగు విభాగము

## రెండవ సెమిస్టర్

రెండవ సెమిస్టర్ పూర్తి అయిన తర్వాత స్టూడెంట్స్ ఈ క్రింది విషయాలలో అవగాహన కలిగి ఉంటారు—

### ప్రాచీన కవిత్వం

- గజేంద్రమోక్షము
- హనుమత్సందేశము
- సుభాషితములు

### ఆధునిక కవిత్వం

- స్నేహలతలేఖ
- అంతర్నాదము
- ప్రపంచపదులు
- ఆల్విదా

### వచనవిభాగం

- యుగాంతం
- ఎంకన్న
- మామిడిపండు
- మావూరుపోయింది

### వ్యాకరణం

ఛందస్సు - అలంకారాలు

# తెలుగు విభాగము

## మూడవ సెమిస్టర్

మూడవ సెమిస్టర్ పూర్తి అయిన తర్వాత స్టూడెంట్స్ ఈ క్రింది విషయాలలో అవగాహన కలిగి ఉంటారు—

### ప్రాచీన కవిత్వం

- ధర్మజుని వాక్చతుర్యం
- విభీషణ శరణాగతి
- గుణనిధి కథ

### ఆధునిక కవిత్వం

- రైతుప్రశస్తి
- గురుదక్షిణ
- గుడిసెలు కాలిపోతున్నాయి

### వ్యాకరణం

శబ్దాలంకారాలు

అర్థాలంకారాలు

# తెలుగు విభాగము

## నాలుగవ సెమిస్టర్

నాలుగవ సెమిస్టర్ పూర్తి అయిన తర్వాత స్టూడెంట్స్ ఈ క్రింది విషయాలలో అవగాహన కలిగి ఉంటారు—

### ప్రాచీన కవిత్వం

- నారదగాన మాత్సర్యం
- వాగ్దానభంగం
- నారసింహశతకం

### ఆధునిక కవిత్వం

- నరుడ నేను, నరుడ నేను
- ఆర్తగీతం
- దేవరకొండ దుర్గం

### వచన విభాగం

- అర్థరాత్రి అరుణోదయం
- సి.పి. బ్రౌన్ సాహిత్యసేవ
- మన గ్రామ నామాలు
- నివురు తొలగిన నిప్పు
- కొండమల్లెలు

తెలుగు విభాగము

ధన్యవాదాలు



## **DEPARTMENT OF SANSKRIT**

### **Programme Specific and Course Outcomes**

#### **SANSKRIT HONORUS**

##### ***Programme Specific Outcomes (PSO):***

Sanskrit is a very rich language of IE language group. Sanskrit is a medium to know about ancient Indian history, culture, religion, social life through its text. The academic programme of both Honours and General degree courses are designed not only professional skill but also develop a deep understanding of rich heritage and dynamic prevalent scenario of India through various Sanskrit texts.

PSO1. Develop a strong concept of ancient Indian history, philosophy and literature.

PSO2. Enhance communication skills-Listening, Speaking, Reading, Writing.

PSO3.Students will be able to write Devnagari scripts which provide them paleographical knowledge to read out the script of modern languages like Hindi and Marathi.

PSO4. Increase in depth knowledge of the Core Areas of the subject.

PSO5.Students will demonstrate the skill needed to participate in conversation that builds knowledge with collaboration.

PSO6.Reasonable understanding of multi-disciplinary relevance of literature of Sanskrit like Veda, Philisophy, Grammar, Kavya, Smitisastra etc.

PSO7. To make them eligible for higher education.

PSO8. Prepare Students for the Profession of teacher, WBCS, UPSC etc.



**Course Outcomes (CO):**

After becoming successful completion of all undergraduate general degree students should be able to achieve the following objectives.

CO1.Students will be able to know ancient Indian history of literature and literary criticism.

CO2. Students would know about the Vedic mantras, their application, Vedic grammar, socio-cultural life.

CO3. Grammar is very important part of this language to make a sentence, to know appropriate meaning of texts, oral communication and perfection. Grammar is the only way to know this language well.

CO4. They will learn about the Indian Philosophy, Religion and Culture in Sanskrit

tradition.CO5.Through Gita they also develop their personality.

CO6.Ayurveda will help them to know the Indian medical tradition.

CO7.They will also know Nation and Nationalism through Sanskrit

literature.CO8.The students will be able to learn the yoga, their concept,

features etc.

## 1st semester

After completion of first semester students will have knowledge in following topics

. Poetry -1) Mudabhishekthum Varada tvamarhasi

2) Himalayo Nama Nagadhiraja

3) Esha dharmah Sanatanah

Prose:- 1) Dharmabadho dauwarikah

2) kruthagne Nasti Nishkruthihi

3) Samskrutha Sambhashanabyasaha

Grammar : - 1) shabdhas

2) Sandhi

## 2nd semester

After completion of 2nd semester students will have knowledge in following topics

Poetry : - 1) Sakthuprasthasya Mahatvam.

2) Buddhasya Vyragyodayaha

3) Daivasura Sampadvibhaga yogaha

Prose: - 1) Vyjnanika Samhita

2) Na Gangadathaha punarethi koopam

Grammar : - 1) Dhatavaha

2) Samasaha

## 3rd semester

After completion of 2nd semester students will have knowledge in following topics

Poetry:- 1) Pravarthatham Prakrithi hitaya Parthivaha

2) Navaratnani

3) Bakthi yogaha (Gita)

Prose:- 1) Shudraka Vyshampayanayoho Sambhashanam

2) Ramadasaha

3) Samskrutha Sambhashanabyasaha

Grammar : - 1) Halantha Shabdhas

2) Bhashantari karanam.

## 4th semester

After completion of 2nd semester students will have knowledge in following topics

Poetry:- 1) Chitrapata darshanam

Proses : - 1) Vivekananda vijayam

2) Vishrutha charitam

3) Dhruvopakhyanam

Grammar :- 1) Prathyayaha

2) Samskrutha Sambhashanabyasaha

## **5th semester**

After completion of 2nd semester students will have knowledge in following topics

poetry: 1) Madhuropadeshaha

2) Brahma shakthirgariyasi

3) Karnabharam

Prose :- 1) shishyanushasanam

2) Mahakavi shastrakara vibhagaha

3) Alankaras

## **6th Semester**

After completion of 2nd semester students will have knowledge in following topics

Poetry: 1) Avanthu Bharata prajaha Swanthantrabharata Prabham.

2) Nachikethopakhyanam

3) Bhathruhari Subhashitani

Prose :- 1) Dhakara katha

2) Mahakavishastrakara vibhagaha

3) Alankaras.

# Program Outcomes

## Program Outcome of Bachelor of Arts (B.A.)

Student seeking admission for B.A. programme is expected to imbue with following quality which helps them in their future life to achieve the expected Goals.

- a. Realization of human values.
- b. Sense of social service.
- c. Responsible and dutiful citizen.
- d. Critical temper
- e. Creative ability.

## Program Specific Outcomes B.A. (Hindi)

On completion of B.A (Hindi), Students are able to:

1. To understand the basic concept and subject of Hindi & its origin
2. To make or not the importance of subject Hindi & its Branches.
3. To understand various aspect of Hindi literature with a process to reach method and giving new mode and direction.
4. To make a attempt in different area and theory such as vocabulary and vice versa
5. To understand in the Literature more in a border areas then Mary confined to subject.
6. To know about Hindi literature its roots cause perspectives and methods.
7. Elaborating and understanding its philosophical methods of Hindi Literature.
8. Evaluating the concept of Hindi from past to present and making the society more closely through literature.

## Course outcomes

**Class: - (Sem. I) Katha Sindhu & Gadya Darpan**

**Paper Name:-Second Language Hindi (Paper I)**

On completion of the course, students are able to

1. To able to understand 'Charitra Sangthan' by Dr. Babu Gulab Rai
2. To able to understand the essay 'Bazar Darshan' by Jainendra Kumar.
3. To able to understand the stories by Prem Chand and Jaishankar Prasad.
4. To able to understand the stories by Yaspal and Bheesma Sahani.

**Class: - (Sem. II) Katha Sindhu & Gadya Darpan**

**Paper Name:- Second Language Hindi (Paper I)**

On completion of the course, students are able to

1. To able to understand the essay by Harishankar Parsai.
2. To able to understand the essay by Mohan rakesh.
3. To able to understand Stories by Usha Priyamvada (Vapasi).
4. To able to understand Hindi Grammar Topics like Sandhi Vichhed, Vilom Shabd and Letter Writing.

**Class: - (Sem. III) Kavya Nidhi**

**Paper Name:-Prachin aadhunik kavya tatha hindi sahitya ka itihaas**

On completion of the course, students are able to

1. To able to Understand the meaning, concept and importance of Poetry.
2. To able to understand various forms of Poetry.
3. To able to understand the Significance of Hindi Sahitya ka Itihaas.
4. To able to Write essay's on various Topics.

**Class: - (Sem. IV) Prachin Aadhunik Kavya Hindi Sahitya ka itihaas**

**Paper Name:-Kavya Nidhi**

On completion of the course, students are able to

1. To able to understand Meera ke pad by Meera bai.
2. To able to understand Bhagwan Buddha ke prati by Suryakant Tripathi 'Nirala'.
3. To able to understand Tu kyon Baith gaya hai path par by harivansh Rai Bacchan.
4. To able to understand Hindi Literature.

**Class: - (Sem. V) Hindi Sahitya sangam**

**Paper Name:-Hindi Bhasha ke Vividh roop**

On completion of the course, students are able to

1. To able to understand the origin of Hindi language and its literature.
2. To able to understand the Importance of Functional Hindi language.
3. To able to understand the Importance of Pravasi Sahitya.
4. To able to understand the various Types of Proses.
5. To able to understand the Jansanchar ke Madhyamon ke Siddhant .

**Class: - (Sem. VI) Hindi Sahitya Sangam**

**Paper Name:-Anuvad ke Siddhant, Patrakarita tatha Sampreshan Koushal**

On completion of the course, students are able to

1. To able to understand the Principles of Translation .
2. To able to understand the How to do Traslation hindi to English Vice Versa.
3. To develop Communication skills.

**Class: - (Sem. I)  
Modern Language**

**Paper Name:-Gadya phulwari**

On completion of the course, students are able to

1. To able to understand the Story Aansun ki Holi by Premchand.
2. To able to understand the Story Mawali by Mohan Rakesh.
3. To able to understand the Story Akeli by Mannu Bhandari.
4. To able to understand the Story Prayashchit by Bhagwaticharan verma.
5. To able to understand the Drama Aashadh ka ek din by Mohan Rakesh.

**Class: - (Sem. II)  
Modern Language**

**Paper Name:-Aadhunik Hindi Kavya**

On completion of the course, students are able to

1. To able to understand the Irony Sadachar ka Taweez by Harishankar parsai.
2. To able to understand the Sansmaran Mamatha Gandhi by Ramkumar Verma.
3. To able to understand the One act play Aawaz ka Neelam by Dharmaveer Bharti.
4. To able to understand the essay Mai Dhobi Hoon by Shivpujan sahay.
5. To able to understand the Novel Aashriton ka Vidroh by Narendra Kohli.

**Class: - (Sem. III)**  
**Modern Language**

**Paper Name:-Madhya Yugeen Kavya evam Aalochana**

On completion of the course, students are able to

1. To able to understand Saakhi ke Dohe by Kabirdas .
2. To able to understand the Bhramargeet saar by Surdas
3. To able to understand Pushp Vatika prasang by Tulsidas.
4. To able to understand by Aalochana ke aadhar Stambh by Acharya Ramchandra Shulk.

**Class: - (Sem. IV)**  
**Modern Language**

**Paper Name:-Madhya Yugeen Kavya, Shabd Shakti evam Anuwaad**

On completion of the course, students are able to

1. To able to understand the Dohe by Bibharilal.
2. To able to understand the Pad by Bhushan.
3. To able to understand the Pad by Ghananand.
4. To able to understand the Shabd Shakti Abidha, Lakshana Vyanajana.
5. To able to understand the Theory and Practical Knowledge Translation.

**Class: - (Sem. IV)**  
**Modern Language**

**Paper Name:-Madhya Yugeen Kavya, Shabd Shakti evam Anuwaad**

On completion of the course, students are able to

1. To able to understand the Dohe by Bibharilal.
2. To able to understand the Pad by Bhushan.
3. To able to understand the Pad by Ghananand.
4. To able to understand the Shabd Shakti Abidha, Lakshana Vyanajana.
5. To able to understand the Theory and Practical Knowledge Translation.

**Class: - (Paper-VI)**  
**Modern Language**

**Paper Name:- Hindi Sahitya ka Itihaas Evam Prayojanmoolak Hindi**

On completion of the course, students are able to

1. To able to understand the Aadikaal part of Hindi Sahitya ka Itihaas.
2. To able to understand the Bhaktikaal part of Hindi Sahitya ka Itihaas.
3. To able to understand the Hindi Story Origin and Development.
4. To able to understand the Novel Origin and Development.
5. To able to understand the Official Language Prayojanmoolak Hindi .



**Class: - (Sem. VI) Paper VII**  
**Modern Language**

**Paper Name:- Aadhunik Kavya : Kavya Akshat**

On completion of the course, students are able to

1. To able to understand the Poem Mera naya Bachpan By Subhadra Kumari chouhan.
2. To able to understand the Poem Hindustan Hamara hai by BalKrishana Sharma Naveen.
3. To able to understand the Poem Pranati by Ramdhari singh Dinkar.
4. To able to understand the Poem Mujhse Chand Kaha Kartha hai by Harivansh Rai Bachhan.
5. To able to understand the Poem Mitti ki Mahima by Agheya.
6. To able to understand the Novel Shabari by Naresh Mehta.

**Class: - (Sem. VI) Paper VIII**  
**Modern Language**

**Paper Name:- Hindi Sahitya ka Itihaas Evam Sanchar Madhyam**

On completion of the course, students are able to

1. To able to understand the Shringar kaal Part of Hindi Sahitya ka Itihaas.
2. To able to understand the Adhunik kaal Part of Hindi Sahitya ka Itihaas.
3. To able to understand the Chayavaad and Pragativaad Part of Aadhunik Kaal.
4. To able to understand the Sanchar Madhyam Evam unke Prakar.

**HOD**  
**Department of Hindi**

**DEPARTMENT OF COMMERCE  
B.COM (GENERAL)**

**PROGRAMME OUTCOMES**

- PO1: Enabling students to develop a positive attitude towards commerce as an interesting and valuable subject of study.**
- PO2: This program could provide Industries, Banking Sectors, Insurance Companies, Financing companies, Transport Agencies, Warehousing etc., well trained professionals to meet the requirements**
- PO3: A student should get a relation ability to pursue advanced studies and research in commerce and management.**
- PO4: After completing graduation, students can get skills regarding various aspects like Marketing Manager, Selling Manager, over all Administration abilities of the Company**
- PO5: understanding of commerce concepts and concerned accounting principles, and should be able to follow the patterns involved in corporate accounting**
- PO6: Students can independently start up their own Business.**
- PO7: Students can get thorough knowledge of finance and commerce.**
- PO8: Capability of the students to make decisions at personal & professional level will increase after completion of this course.**
- PO9: The knowledge of different specializations in Accounting, costing, banking and finance with the practical exposure helps the students to stand in organization.**
- P10: Students can independently start up their own Business.**

## **SPECIFIC PROGRAM OUTCOMES FOR B.COM(GENERAL)**

**SPO1:** The students can get the knowledge, skills and attitudes during the end of the B.com degree course.

**SPO2:** By goodness of the preparation they can turn into a Manager, Accountant , Management Accountant, cost Accountant, Bank Manager, Auditor, Company Secretary, Teacher, Professor, Stock Agents, Government employments and so on.

**SPO3:** Students will prove themselves in different professional exams like C.A.,C S, CMA, MPSC, UPSC. As well as other coerces.

**SPO4:**The students will acquire the knowledge, skill in different areas of communication, decision making, innovations and problem solving in day to day business activities.

**SPO5:** Students will gain thorough systematic and subject skills within various disciplines of finance, auditing and taxation, accounting, management, communication, computer.

**SPO6:**Students can also get the practical skills to work as accountant, audit assistant, tax consultant, and computer operator. As well as other financial supporting services.

**SPO7:** Students will learn relevant Advanced accounting career skills, applying both quantitative and qualitative knowledge to their future careers in business.

**SPO8:** Students will be able to do their higher education and can make research in the field of finance and commerce.

**SPO9:** The skills and knowledge gained has intrinsic beauty, which also leads to proficiency in analytical reasoning. This can be utilized in modelling and solving real life problems.

**SPO10:** To recognize patterns and to distinguish between essential and irrelevant aspects of problems. By goodness of the preparation they can turn into a Manager, Accountant , Management Accountant, cost Accountant, Bank Manager, Auditor, Company Secretary, Teacher, Professor, Stock Agents, Government employments and so on., understanding, analysis and synthesis.

**SPO12:** Ability to share ideas and insights while seeking and benefiting from knowledge and insight of others. This helps them to learn behave responsibly in a rapidly changing interdependent society.

**SPO13:**Students can also get the practical skills to work as accountant, audit assistant, tax consultant, and computer operator. As well as other financial supporting services.

**SPO14:** Students will be able to do their higher education and can make research in the field of finance and commerce

**SPO15:**The students will acquire the knowledge, skill in different areas of communication, decision making, innovations and problem solving in day to day business activities

**SPO16:**Students will learn relevant Advanced accounting career skills, applying both quantitative and qualitative knowledge to their future careers in Business.

**Department of commerce**  
**B.COM(GENERAL) Course Outcomes**  
**SEM I Paper 101 FINANCIAL ACCOUNTING**

After the completion of the course, Students will be able to

**CO1:**To acquire conceptual knowledge of basics of accounting and preparation of final accounts of sole trade

**C02:** Introduction of accounting standards and cycle

**CO3:**Preparation of final accounts, bank reconciliation statement.

**CO4:**The student will get thorough knowledge on the accounting practice prevailing in partnership firms and other allied aspects.

**C 05:**–To enable the students to learn principles and concepts of Accountancy.Students are enabled with the Knowledge in the practical applications of accounting.

**C06:-** To enable the students to learn the basic concepts of Partnership Accounting, and allied aspects of accounting.

**CO7:-** The student will get thorough knowledge on the accounting practice prevailing in partnership firms and other allied aspects.

**SEM-I PAPER –I02 BUSINESS ORGANISATION AND MANAGEMENT**

After the completion of the course, Students will be able to

**C01:-** To acquaint the students with the basics of Commerce and Business concepts and functions, forms of Business Organization and functions of Management.

**C02:-** Types of organisations, procedures and policies in establishment of organisations.

**C03:-**Registration of a Joint Stock Company.

**C04:-**Management, scientific management ,planning

**C05:-**Coordination and cooperation, Authority and responsibility.

### **SEM I PAPER – 103 (G) FOREIGN TRADE**

- To gain knowledge of India's foreign trade procedures policies, and international institutions.
- To get knowledge about trade policy.
- Balance payments.
- Growth and significance of Trade Blocs
- To acquire knowledge about international economic institutions such as world bank, IMF, UNCTAD etc.,

### **SEM II PAPER - 201 FINANCIAL ACCOUNTING II**

- To acquire accounting knowledge of bills of exchange and other business accounting methods.
- To learn accounting procedures in Bills of Exchange and Consignments.
- Preparation of accounts of profit and non profit organizations.
- Conversion of accounts from single entry to double entry book keeping system.

### **SEM II PAPER – 202 BUSINESS LAWS**

- To understand basics of contract act, sales of goods act, IPRs and legal provisions applicable for establishment, management and winding up of companies in India.
- To understand the basics of consumer protection act,
- Students to get knowledge about intellectual property rights and its registration and other government procedures.
- Management of companies and meetings, corporate governance, corporate social responsibility.
- Conducting shareholders meetings, rules and regulations

### **SEM II PAPER 203 BANKING AND FINANCIAL SERVICES**

- To familiarize with Fund-based, Non-fund-based Financial Services and Banking activities.
- To acquire the knowledge in banking sector
- To get knowledge in the norms of banking and relationship between banker and various types of costumers.
- To gain acquaintance in negotiable instruments.
- To get future knowledge in financial services and its significance and application.

### **SEM III PAPER – 301 ADVANCED ACCOUNTING**

- To acquire accounting knowledge of partnership firms and joint stock companies.
- Preparation of capital accounts in fixed and fluctuating , admission of a partner, death, retirement, goodwill treatment.
- Corporate companies , share issue, debentures issue, forfeiture of shares
- Preparation of final accounts of companies. • Valuation of goodwill and accounting treatment.

### **SEM III PAPER – 302 BUSINESS STATISTICS**

- To inculcate analytical and computational ability among the students.
- Importance of statistics in business decisions.
- Data collection – primary and secondary, editing and tabulation ,diagrammatic and graphic presentation
- Analysis of data by using statistical methods.

### **SEM III SEC PAPER FUNDAMENTALS OF DIGITAL MARKETING AND WEB DESIGN**

- To make students to understand Foundation of digital marketing.
- To make students to understand the Fundamentals of Web design and Analytics.
- Online and mobile marketing – tools , setup and foundation
- CRO- GOOGLE analytics

### **SEM III PAPER – 304 FINANCIAL INSTITUTIONS AND MARKETS**

- To familiarize with various Financial Institutions and Markets
- To understand Indian financial system – commercial banks, venture capital
- Money market – Monetary policy
- Debt markets - government and non-government bonds

### **SEM IV SEC –401 Principles of life insurance**

- Intends to provide a basic understanding of the insurance mechanism.
- It explains the concept of insurance and how it is used to cover risk.
- It gives the student an insight into the different types of life insurance plans & products and its variations.
- Identify the relationship between insurer and their customers and the importance of Insurance contracts.

### **SEM IV PAPER – 402 INCOME TAX**

- To acquire conceptual and legal knowledge about Income Tax provisions relating to computation of Income from different heads with reference to an Individual Assessee..
- Direct and indirect incomes, agricultural incomes and non-agricultural incomes and heads of income
- Students learn computation of income different heads like salaries, house property, business or professional incomes, capital gains and other sources.

## **SEM IV PAPER – 403 BUSINESS STATISTICS II**

- To inculcate analytical and computational ability among the students.
- To learn business predictions by using regression analysis.
- Focusing on construction of index numbers and uses.
- Time series analysis – implementing in business

## **SEM IV PAPER –404 CORPORATE ACCOUNTING**

- To acquire knowledge of AS-14 and preparation of accounts of banking and insurance companies.
- The role of liquidator in winding up of a company and preparation of accounts (closure)
- As-14 as per amalgamation, absorption and reconstruction
- Maintaining of statutory reserves and accounts in bank accounts.
- Preparation of insurance companies accounts and Claims

## **SEM IV SEC- 501 BUSINESS ECONOMICS**

- To acquire knowledge for application of economic principles and tools in business practices.
- To understand Demand and supply analysis – importance of various elasticity of demand and supply
- To study cost and revenue relationships ,assumptions ,uses and limitations

## **SEM V PAPER 502 COST ACCOUNTING**

- To make the students acquire the knowledge of cost accounting methods
- To understand students about good cost accounting system and differences between cost accounting with other accounts.
- Students to learn cost accounting techniques and methods.

## **SEM V PAPER 503 COMPUTERISED ACCOUNTING**

- To make the students to acquire the knowledge of computer software
- Creation of company through tally ERP 9
- Creation of groups and ledgers
- Maintaining stock keeping units
- Recording voucher entries
- Management of accounts receivables and payables and MIS reports.

### **SEM V PAPER-505 (G) AUDITING**

- To understand meaning and elements of auditing and gain knowledge for execution of audit.
- Student has to distinguish internal audit, internal control and internal check.
- Differences between auditing and vouching.
- Preparation of audit reports.

### **SEM VI PAPER - 601 RESEARCH METHODOLOGY AND PROJECT REPORT**

- To introduce the basics of conducting research in social sciences.
- Procedure involved in conducting social research i.e., identification of problem , review of literature, identification of research gap, topic selection, development of objectives of the study.
- Collection of data, interpretation of data with the help of statistical tools , report writing, conclusion, limitations of the study.

### **SEM VI PAPER - 602 COST CONTROL AND MANAGEMENT ACCOUNTING**

- To be acquaint with Cost Control techniques, Managerial Accounting decisionmaking techniques and reporting methods.
- To acquire knowledge about marginal costing , budgets and budgetary control
- Interpretation of financial statements – business decisions

### **SEM VI PAPER - 603 THEORY AND PRACTICE OF GST**

- To equip the students with the knowledge regarding Theory and Practice of GST.
- GST-Introduction, VAT on capital goods.
- Recording of Advanced entries, GST Adjustment and Filing of returns.
- Recording of advanced entries and migration
- Generating GSTR- Report in ERP
- GSTIN/UIN - Creation of GST Duty ledgers.



## SEM VI PAPER –604(GEN) ACCOUNTING STANDARDS

- To make the students acquire the knowledge and application of Indian Accounting Standards
- Students to be equipped with accounting theory, principles, standards.
- Adoption of accounting standards, preparation of financial reports.
- Business acquisitions and consolidations – accounting standards
- Concepts of financial reports and recent trends.

### DEPARTMENT OF COMMERCE B.COM (COMPUTERS)

#### PROGRAMME OUTCOMES

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- PO2: This program could provide Industries, Banking Sectors, Insurance Companies, Financing companies, Transport Agencies, Warehousing etc., well trained professionals to meet the requirements**
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**Department of commerce**  
**Course Outcomes**

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**C03:-** Registration of a Joint Stock Company.

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**C05:-** Coordination and cooperation, Authority and responsibility.

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- To gain acquaintance in negotiable instruments.
- To get future knowledge in financial services and its significance and application.

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- Corporate companies , share issue, debentures issue, forfeiture of shares
- Preparation of final accounts of companies.
- Valuation of goodwill and accounting treatment.

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- To inculcate analytical and computational ability among the students.
- Importance of statistics in business decisions.
- Data collection – primary and secondary, editing and tabulation ,diagrammatic and graphic presentation
- Analysis of data by using statistical methods.

### **SEC PAPER FUNDAMENTALS OF DIGITAL MARKETING AND WEB DESIGN**

- To make students to understand Foundation of digital marketing.
- To make students to understand the Fundamentals of Web design and Analytics.
- Online and mobile marketing – tools , setup and foundation
- CRO- GOOGLE analytics

#### **PAPER – 304 FINANCIAL INSTITUTIONS AND MARKETS**

- To familiarize with various Financial Institutions and Markets
- To understand Indian financial system – commercial banks, venture capital
- Money market – Monetary policy
- Debt markets - government and non-government bonds

#### **SEC –401 Social Media Marketing Search Engine Optimization & Online Advertising**

- To make students to understand the Social Media marketing.
- To make students to understand the Search engine optimization and online advertising.
- Marketing and monetising on youtube , facebook and twitter analytics
- Social engine optimization (SEO) remarking with google

#### **PAPER – 402 INCOME TAX**

- To acquire conceptual and legal knowledge about Income Tax provisions relating to computation of Income from different heads with reference to an Individual Assesee..
- Direct and indirect incomes, agricultural incomes and non-agricultural incomes and heads of income
- Students learn computation of income different heads like salaries, house property, business or professional incomes, capital gains and other sources.

#### **SEM IV PAPER – 403 BUSINESS STATISTICS II**

- To inculcate analytical and computational ability among the students.
- To learn business predictions by using regression analysis.
- Focusing on construction of index numbers and uses.
- Time series analysis – implementing in business

#### **SEM V SEC- 501 BUSINESS ECONOMICS**

- To acquire knowledge for application of economic principles and tools in business practices.
- To understand Demand and supply analysis – importance of various elasticity of demand and supply
- To study cost and revenue relationships ,assumptions ,uses and limitations

### **SEM V PAPER 502 COST ACCOUNTING**

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- To understand students about good cost accounting system and differences between cost accounting with other accounts.
- Students to learn cost accounting techniques and methods.

### **SEM V PAPER 503 COMPUTERISED ACCOUNTING**

- To make the students to acquire the knowledge of computer software
- Creation of company through tally erp 9
- Creation of groups and ledgers
- Maintaining stock keeping units
- Recording voucher entries
- Management of accounts receivables and payables and MIS reports.

### **SEM V PAPER – 504 E COMMERCE**

- To acquire conceptual and application knowledge of ecommerce.
- E-Marketing – E-Advertising - E Banking - Mobile Commerce - E-Trading - E-Learning - E-Shopping
- .Frame work of e commerce
- Consumer oriented e commerce applications and electronic data inter change .
- E marketing techniques

### **SEM VI PAPER - 601 RESEARCH METHODOLOGY AND PROJECT REPORT**

- To introduce the basics of conducting research in social sciences.
- Procedure involved in conducting social research i.e., identification of problem , review of literature, identification of research gap, topic selection, development of objectives of the study.
- Collection of data, interpretation of data with the help of statistical tools , report writing, conclusion, limitations of the study.

**SEM VI PAPER - 602    COST CONTROL AND MANAGEMENT  
ACCOUNTING**

- To be acquaint with Cost Control techniques, Managerial Accounting decision making techniques and reporting methods.
- To acquire knowledge about marginal costing , budgets and budgetary control
- Interpretation of financial statements – business decisions

**SEM VI PAPER - 603 THEORIES AND   PRACTICE OF GST**

- To equip the students with the knowledge regarding Theory and Practice of GST.
- GST-Introduction, VAT on capital goods.
- Recording of Advanced entries, GST Adjustment and Filing of returns.
- Recording of advanced entries and migration
- Generating GSTR- Report in ERP
- GSTIN/UIN - Creation of GST Duty ledgers.

## DEPARTMENT OF MANAGEMENT B.B.A

### PROGRAMME OUTCOMES

- PO1:** . Acquire adequate knowledge in the Principles, Theories and Models of Business Management, Accounting, Marketing, Finance, IT, Operations and Human Resource.
- PO2:** Develop managerial, behavioral, strategic thinking, commercial awareness and mentoring skills.
- PO3:** . Analyze and comprehend the applicability of management principles in solving complex business problems.
- PO4:** Identify, describe, propose, synthesize and present business reports through SPSS, Tally and MS-Office as per the industrial needs.
- PO5:** Demonstrate English proficiency for Business Communication for effective and Professional business management..
- PO6:** Obtain the ability to lead a team and develop group behaviour in achievement of individual, group and organizational goals..
- PO7:** . Develop appropriate entrepreneurial skills so as to become competent business entrepreneurs..
- PO8:** Recognize and solve business problems in an ethical manner for continuous development of business venture.
- PO9:** Develop lifelong learning skills with interdisciplinary approach towards sustainable development.

### SPECIFIC PROGRAM OUTCOMES FOR BBA

- SPO1:** Students will acquire and demonstrate analytical and problem solving skills with in various disciplines of management, business, accounting, economics, finance, marketing, English and Languages.
- SPO2:** Students will attain proficiency in analyzing the opportunities and challenges of global and dynamic business environment.
- SPO3:** Communicate in a business context in a clear, concise, coherent and professional manner.
- SPO4:** Ability to design, develop and apply business models and strategies to address business problems with special reference to finance and the needs and interest of various stakeholders.
- SPO5:** Graduates can join professional career in field of finance, FMCG, retail, banking, pharma, financial institutions, stock exchanges and mortgage organizations and allied industries (Employability).
- SPO6:** Think in a critical manner.
- SPO7:** Graduates should be able to start their own business venture or exhibit entrepreneurial skills for their employer organization (Entrepreneurship).
- SPO8:** Graduates will develop positive attitude and life skills which will enable them to become a multi facet personality with a sense of Environmental consciousness and responsible Citizen with moral and ethical values (Ethical and committed citizen).
- .



## **SEM-I PRINCIPLES OF MANAGEMENT (PAPER -I)**

After the completion of the course, Students will be able to

- CO1 Identify the key concepts of management
- CO2 Explain the evolution of Management thought
- CO3 Classify the different types of plans and decision making process
- CO4 Analyse the different organization structures in the organization
- CO5 Evaluate the effectiveness of coordination and control techniques of the organization

## **DEPARTMENT OF MANAGEMENT**

### **SEM-I BASICS OF MARKETING (PAPER - II)**

After the completion of the course, Students will be able to

- CO1 Expressing the Marketing as an important function and make students know about the basic concepts of Marketing
- CO2 Develop an idea of marketing environment and its components
- CO3 Familiarise the students with Marketing Information Systems and its contents
- CO4 Identifying insights about Demand Analysis in Marketing Context
- CO5 Explaining students about the process of Segmentation, Targeting.

### **SEM-I BUSINESS ECONOMICS ( PAPER III)**

After the completion of the course, Students will be able to

- C01:** To understand and importance.
- C02:** To analyse the importance of study of Consumer Behaviour towards Utility analysis.
- C03:** To apply various methods (Supply, Demand, Price.etc) to behavior and social Phenomena. recognize the basic concepts of Economics and its
- C04:** To Develop in-depth competencies towards Production and various costs involved.
- C05:** The Different types of markets & how prices are determined under those markets.

### **SEM-II Organisational Behaviour**

After the completion of the course, Students will be able to

- CO1 Identify the disciplines and factors contributing for the effectiveness of OB
- CO2 Analyse the components of Individual and Interpersonal behaviours in organizational context.
- CO3 Demonstrate different leadership styles and skills required in working groups and teams
- CO4 Evaluate different approaches of change and types of culture CO5 Explain the concepts of codecrease the roots, removal of terms.
- C04:**Solve the reciprocal equations.

<b>SEM-II Business Statistics</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1 Define Basic concepts of statistics in business and their applications</p> <p>CO2 Describe about skewness and curtosis and become capable in understanding their applications</p> <p>CO3 Practically use regression analysis in research and business situations</p> <p>CO4 To generate an understanding of Index numbers and their applications</p> <p>CO5 To provide application capabilities of Time series analysis in business situations</p>
<b>SEM - II Financial Accounting</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1 Discuss fundamental accounting principles, functions, uses and accounting cycle</p> <p>CO2 Present journal entries using double entry bookkeeping and post in ledger accounts and Prepare Trial balance</p> <p>CO3 Estimate the balances of two column, three column, petty cash book and other subsidiary books</p> <p>CO4 Perform the steps in the preparation of final accounts (sole proprietorship)</p> <p>CO5 Find value of an asset using SLM, WDV methods of depreciation</p>
<b>SEM – III Basic Quality Management</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1.Examining the concepts of quality management and performance excellence in organizations</p> <p>CO2 . Evaluating the historical developments in the quality movement and their importance.</p> <p>CO3. Analyzing quality in organizations such as manufacturing, service, healthcare, education, government</p> <p>CO4 . Examining the role of process in Operations Management and identify general types of processes.</p> <p>CO5 . Illustrating the fundamental principles and practices of quality and performance excellence</p>
<b>SEM - III Human Resource Management</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1 Identify the importance of human resources and their effective management in organizations</p> <p>CO2 Compare and Contrast different tools used in forecasting and planning human resource needs</p> <p>CO3 Summarizing the appropriate use of Job analysis and Job design Processes</p> <p>CO4 Demonstrate the ability to prepare the Recruitment and selection strategies for a specific job</p> <p>CO5 Develop the different Post Selection processes followed in the Organization.</p>
<b>SEM - III Information Technology For Business</b>
<p>After the completion of the course, Students will be able to</p>

CO1 Identify the components of computers and analyze the basic concepts of operating systems  
CO2 Interpret the basic concepts of Information Systems  
CO3 Extract the knowledge of Multimedia concepts  
CO4 Execute online transactions through Internet  
CO5 Analyze office management applications

### **SEM -III Financial Management**

After the completion of the course, Students will be able to

CO1 Demonstrate functions of financial management in business corporations, Knowledge of the value of money overtime  
CO2 Calculate the various capital budgeting techniques for taking investment decisions  
CO3 Distinguish between equity, debt and preference capital. Calculate specific cost of capital and weighted average cost of capital  
CO4 Demonstrate the concept of working capital Determine working capital estimation  
CO5 Calculate value of the firm using Walter's Model, Gordon's Model dividend theories

### **SEM -IV Start up Management.**

After the completion of the course, Students will be able to

CO 1. The students will be able to adapt oral and visual presentation skills and establish a foundation of confidence. The students will understand what characterizes an attractive business opportunity and common pitfalls during the entrepreneurial process.

CO 2. The students will be able to adapt to the changing circumstances that occur during the entrepreneurial process. The students will be able to mobilize people and resources. Students can now identify and secure customers and team members through networks.

CO 3. The students will be able to detect weaknesses and strengths within a business opportunity and give suggestions of how to improve these weaknesses and utilize these strengths.

CO 4. Students will be able to define, identify and apply the knowledge of new venture financing and growth financing.

### **SEM -IV Leadership and Change Management**

After the completion of the course, Students will be able to

CO1 To identify key theoretical concepts of Leaderships  
CO2 To develop an understanding of basic attributes, behaviours and styles of Leadership  
CO3 To learn how to design and develop leadership in decision making teams and groups.  
CO4 To develop insights and acquire a sound knowledge regarding the role and concepts of organisational change  
CO5 To identify the process of effective planned change

<b>SEM -IV Business Law and Ethics</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1 To Identify essential elements of contract act 1872.  CO2 To Define concepts of sale of goods act and to Distinguish sale and agreement to sale  CO3 To Summarize various types and characteristics of negotiable instruments under Negotiable Instruments ac 1881  CO4 To Summarize the formation, MOA, AOA along with Highlights of Companies act 2013.  CO5 TO Explain Consumer protection Act and outline concepts of IPR</p>
<b>SEM -IV Market Research</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1 Explain the meaning and importance of research, explain the types of research, the research process, and a hypothesis, and explain the types of research designs  CO2 Explain the methods of data collection for research, enumerate the contact methods, describe the research instruments for data collection, explain the importance of census and sample survey, explain the steps and methods of sampling, determining the sample size.  CO3 Describe the various levels of measurement and the types of measurement scales, explain the validity and reliability of a scale  CO4 Formulate and test a hypothesis using parametric and nonparametric tests such as ANOVA, Chi-square, McNemar, Wilcoxon matched pairs test, Mann Whitney U test, Kruskalwallis test  CO5 Explain the methodology and precautions while writing reports &amp; writing a report.</p>

<b>SEM -IV Management Science</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: Memorize the concepts related to retail management.  CO2: To identify the location to set up a plant and layout with required process technologies  CO3: To analyse and implement problem solving approach using linear programming.  CO4: To analyse and implement problem solving approach using Transportation Problems  CO5: To Recognize the work study, Plant Layout and Plant Maintenance</p>
<b>SEM -V Financial Markets and Services</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: Understanding the concepts, structure, functioning and theories related to financial markets, institutions and services  CO2: Analyzing the different types of financial markets and the product traded therein.  CO3: Illustrating an awareness of the current structure and functioning of the financial Markets, Institutions and Services.  CO4: Demonstrating an awareness of the regulation of the Indian Financial Markets, Institutions and services sector.  CO5: Evaluating and creating strategies to promote financial products and services. CO6: Identifying the Regulators in Financial System and understanding the role of various intermediaries in the system</p>

<b>SEM-V Brand Management</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: To recognize the Concept of Branding, strategies, brand positioning.  CO2: To relate the Integration of advertising and Branding in marketing.  CO3: To demonstrate the designing and implementing brand strategies</p>
<b>SEM-V Organisation Development</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: Understand and apply key models of OD like 6 box model, Burke Litwin model etc.  CO2: Explain the success stories of OD in some top Indian and global companies  CO3: Apply strategic tools like Porter's five forces model, value discipline  CO4: Assess their organizations using organizational diagnostic models like Malcolm Balridge Award Criteria, the EQFM model  CO5: Using various models to plan successful HR change interventions for HR process up-gradation</p>
<b>SEM-V Analysis of Investment in Financial Assests</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: understanding the measures of risk and return in financial assets, based on the characteristics of different financial assets and value assets such as stocks and bonds for investment, concept and theories of traditional and modern portfolio management  CO2: analyzing stock returns and risk in economic environment and indicators and using various models for the purpose of investment.  CO3: measuring the risk and return of a portfolio position and diversify and manage investment portfolios in accordance with a person's risk preferences  CO4: evaluating investment advice from brokers to develop optimal portfolio and selecting best portfolio based on different evaluation model</p>
<b>SEM-V Retail Management</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: To familiarize with the concept of retailing and its management.  CO2: To understand the flow of goods from manufacturers to end users and the role of retailers in the same</p>
<b>SEM-V Performance Appraisal and Counseling</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: To discuss the purposes for performance appraisals  CO2: Discuss the commonly used performance measurement methods and forms  CO3: Understand the drawbacks of 360 degree evaluation  CO4: Steps to be taken to avoid problems with appraisal process</p>

<b>SEM-V Insurance Services</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1:. To understand the overview of about insurance industry  CO2: To make students understand various principles , provisions that govern the life and general insurance contracts</p>
<b>SEM-V. Customer Relationship Management</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: To be aware of the nuances of customer relationship  CO2: To analyze the CRM link with the other aspects of marketing  CO3: To impart the basic knowledge of the Role of CRM in increasing the sales of the company  CO4: To make the students aware of the different CRM models in service industry</p>
<b>SEM-V Compensation management</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: To discuss the principles and importance of compensation management  CO2: To relate the bases of compensation  CO3: To appraise the present trends in calculation of incentives and other pay systems  CO4: To develop and design compensation system  CO5: To identify the contemporary compensation practices</p>
<b>SEM-VI Business Analytics</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1:. The basic objective of this course is to familiarize the students with nature and dimensions of evolving business environment in India to influence managerial decisions.</p>
<b>SEM-VI . Banking</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: To understand the basics of Banking and the emergence of Banking in India  CO2: To get acquainted with the functionality of the banks  CO3: To know the meeting and use of commonly used technologies in Banking</p>

<b>SEM-VI Buyer Behaviour</b>
<p>After the completion of the course, Student will be able to</p> <p>CO1: To explain the concept of Buyer Behaviour &amp; describe buyer research process in detail  CO2: To evaluate the factors affecting buyer behaviour in detail  CO3: To analyze the consumer decision process  CO4: To assess the impact of consumer's motivation, personality on the buying behavior  CO5: To impart the basic knowledge of consumer protection rights</p>
<b>SEM-VI Leadership and Change Management</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: To understand the concept, qualities and essentials of leadership  CO2: To understand the meaning of change and need for organizational change  CO3: To appraise the students with the change management process</p>
<b>SEM-VI RISK ANALYSIS AND MANAGEMENT</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: demonstrate knowledge of the range of financial and financial related risks facing organisations  CO2: understand the approach to risk management through risk identification, risk measurement and risk management (or mitigation)  CO3: understand reputational risk  CO4: understand operational risk and how to manage it.</p>
<b>SEM-VI Advertising and Sales Promotion</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: To discuss the Concept of Advertising, History, functions of advertising.  CO2: To analyze the different Types of Advertising, department, designing advertising copy and strategy used by the marketers</p>
<b>SEM-VI Talent and Knowledge Management</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: Evaluate the potential and appropriateness of talent development strategies, policies and methods with reference to relevant contextual factors  CO2: Assess the role and influence the politics of knowledge management policy and practice in contents.</p>

<b>SEM-VI International Finance</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: To recognize the Concept of Foreign Exchange Markets  CO2: To Apply the Concept of International Parity Relations  CO3: To apply the derivatives for Risk Management with special Reference to Currency  CO4: To give the Concept of International Tax Management</p>
<b>SEM-VI Rural Marketing</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: Analyse marketing environment, consumer behaviour , distribution channels, marketing strategies , etc. in the context of rural markets in India  CO2: Categorize issues in rural markets</p>
<b>SEM-VI Employees Relations</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: To gain insights into conceptual knowledge on industrial relations  CO2: To appraise the extent to which the workers can participate in management  CO3: To interpret the mechanism for resolving industrial disputes  CO4: To realize the provision for payment of wages.    CO5: To discuss the legal framework of factories act.</p>
<b>SEM-VI Project Report &amp; Viva</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: To enable students to apply the conceptual knowledge in a practical situation and to learn the art and science of conducting a study in a systematic way and presenting its findings in the form of report.</p> <p>CO2: To practice the skills, diligence, and commitment to excellence needed to engage in lifelong learning.</p> <p>CO3: To identify, analyze, and solve problems creatively through sustained critical investigation.</p>





# DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

## B.Sc. (COMPUTER SCIENCE)

### PROGRAMME OUTCOMES

**At the end of the program students will have:**

**PO1: Essential Knowledge:**

Comprehensive discipline knowledge and understanding of computer functionality various uses of applications, computer science involved in basic application working to creation and to apply their knowledge in practice.

**PO2: Creative and critical thinking and problem-solving abilities:**

Be effective problem solvers, able to apply critical and evidence-based thinking and to put in front the programming challenges in computer science and to conceive innovative responses to future challenges.

**PO3: Teamwork and communication skills:**

Be able to convey ideas and information effectively to a range of audiences for a variety of purposes and contribute in a positive and collaborative manner to achieving goals.

**PO4: Professionalism and leadership readiness:**

Be able to engage in professional behavior and have the potential to take leadership roles in their chosen occupations and communities.

**PO5: Intercultural and ethical competency:**

Be responsible and effective global citizens whose personal values and practices are consistent with their roles as responsible members of society.

**PO6: Social responsibility:**

Be sensitive to and demonstrate experimental evidence which does not affect the society.

**SPECIFIC PROGRAM OUTCOMES FOR  
B.Sc. (COMPUTER SCIENCE)**

- SPO1:** A student should be able to recall basics concepts in computer and should be able to work or operate.
- SPO2:** A student should get adequate exposure to global and local concerns that explore them many aspects of computer science & applications.
- SPO3:** Student is equipped with creative talent and power of communication necessary for various kinds of employment.
- SPO4:** Student should be able to apply their skills and knowledge in practical's.
- SPO5:** Enabling students to develop a positive attitude towards programming languages as an interesting & valuable subject of study.
- SPO6:** Think in a critical manner.
- SPO7:** Acquire good knowledge and understanding in advanced areas of computer science & applications chosen by the student from the given courses.
- SPO8:** The skills and knowledge gained has intrinsic beauty, which also leads to proficiency. This can be utilized in modelling and solving real life problems.
- SPO9:** To recognize patterns and to distinguish between essential and irrelevant aspects of problems.
- SPO10:** Ability to share ideas and insights while seeking and benefitting from knowledge and insight of others. This helps them to learn behave responsibly in a rapidly changing interdependent society.
- SPO11:** This Program will also help students to enhance their employability for jobs in research institutes, IT origination and teaching fields, scientific data analyst and in various other public and private companies.

<b>SEM-I PROGRAMMING IN C</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: Understanding functional hierarchical code organization.  CO2: Ability to define and manage data structures based on problem subject domain.  CO3: Ability to work with textual information, characters, and strings.  CO4: Ability to work with arrays of complex objects.  CO5: Understanding a concept of object thinking within the framework of functional model.  CO6: Understanding a concept of functional hierarchical code organization.  CO7: Understanding a defensive programming concept. Ability to handle possible errors during program execution.</p>
<b>SEM-II PROGRAMMING IN C++</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: an ability to incorporate exception handling in object-oriented programs.  CO2: an ability to use template classes and the STL library in C++.  CO3: an understanding of the concepts of OOPs including inheritance and polymorphism.  CO4: an ability to overload operators in C++.  CO5: an understanding of the difference between function overloading and function overriding.</p>
<b>SEM-II BASIC COMPUTER SKILLS (AECC -2)</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: Understanding the concept of input and output devices of Computers.  CO2: Learn the functional units and classify types of computers, how they process information and how individual computers interact with other computing systems and devices.  CO3: Understand an operating system and its working, and solve common problems related to operating systems.  C 4: Learn basic word processing, Spreadsheet and Presentation Graphics Software skills.  C 5: Study to use the Internet safely, legally, and responsibly.</p>
<b>SEM-III DATA STRUCTURE USING C++</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms.  CO2: Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs.  CO3: Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs.  CO4: Demonstrate different methods for traversing trees.  CO5: Illustrate various technique to for searching, Sorting and hashing.  CO6: Describe the concept of recursion, give examples of its use, describe how it can be implemented using a stack.  CO7: Discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing.  CO8: Summarize different categories of data Structures.</p>

<b>SEM-III PYTHON -1 (SEC - 2)</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: To understand why Python is a useful scripting language for developers.CO2: To learn how to use lists, tuples, and dictionaries in Python programs.</p> <p>CO3: To learn how to identify Python object types.</p> <p>CO4: To learn how to use indexing and slicing to access data in Python programs.CO5: To define the structure and components of a Python program.</p> <p>CO6: To learn how to write loops and decision statements in Python.CO7: To learn how to write functions and pass arguments in Python.</p>
<b>SEM-IV DATABASE MANAGEMENT SYSTEMS</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: Understand the normalization of databases through various case studies.</p> <p>CO2: Use of query optimization techniques, backup and recovery features of database management software.</p> <p>CO3: Create a new database and administer the database management software.</p> <p>CO4: Develop different web databases and object-oriented database management system.</p> <p>CO5: Describe the usage of data mining tools.</p>
<b>SEM-IV PYTHON -2 (SEC - 4)</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: To learn how to build and package Python modules for reusability.CO2: To learn how to read and write files in Python.</p> <p>CO3: To learn how to design object-oriented programs with Python classes.CO4: To learn how to use class inheritance in Python for reusability.</p> <p>CO5: To learn how to use exception handling in Python applications for error handling.CO6: To acquire programming skills in core Python.</p> <p>CO7: To acquire Object Oriented Skills in Python</p>
<b>SEM-V PROGRAMMING IN JAVA</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: To learn Object Oriented Programming language.CO2: To learn database programming using Java.</p> <p>CO3: To handle abnormal termination of a program using exception handling.CO4: To create flat files.</p> <p>CO5: To study web development concept using Servlet and JSP.</p>
<b>SEM-V INFORMATION TECHNOLOGIES (GE)</b>

<p>After the completion of the course, Students will be able to</p> <p>CO1: Design and develop software solutions for contemporary business environments by employing appropriate problem-solving strategies.</p> <p>CO2: Configure and administer database servers to support contemporary business environments.CO3: Comprehend and resolve common desktop and network issues.</p> <p>CO4: Analyze common business functions and identify, design, and develop appropriate information technology solutions (in web, desktop, network, and/or database applications).</p> <p>CO5: Learn future technologies through acquired foundational skills and knowledge and employ them in new business environments.</p> <p>CO6: Practice communication, problem solving and decision-making skills using appropriate technology and with the understanding of the business environment.</p>
<b>SEM -VI WEB TECHNOLOGIES</b>
<p>After the completion of the course, Students will be able to:</p> <p>CO1: Explain the history of the internet and related internet concepts that are vital in understanding web development.</p> <p>CO2: Discuss the insights of internet programming and implement complete application over the web.CO3: Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet.</p> <p>CO4: Utilize the concepts of JavaScript and Java</p> <p>CO5: Use web application development software tools i.e. Ajax, PHP and XML etc. and identify the environments currently available on the market to design web sites.</p>
<b>SEM -VI PHP WITH MySQL (DSE A)</b>
<p>After the completion of the course, Students will be able to</p> <p>CO1: Learn Core-PHP, Server-Side Scripting Language.CO2: Learn PHP-Database handling.</p> <p>CO3: Learn different technologies used at client-Side Scripting Language.CO4: Learn XML, CSS and XML parsers.</p> <p>CO5: One PHP framework for effective design of web application.CO6: Learn JavaScript to program the behavior of web pages.</p> <p>CO7: Learn AJAX to make our application more dynamic. Design a commercial relational database system (Oracle, MySQL) by writing SQL using the system.</p>
<b>SEM -VI MAJOR PROJECT (DSE B)</b>
<p>CO1: Students should be able to design and construct a hardware and software system, component, or process to meet desired needs.</p> <p>CO2: Students are provided to work on multidisciplinary Problems.</p> <p>CO3: Students should be able to work as professionals, with portfolio ranging from data management, network configuration, designing hardware, database and software design to management and administration of entire systems.</p>

# DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

## B. Com (COMPUTER APPLICATIONS)

### PROGRAMME OUTCOMES

**At the end of the program students will have:**

**PO1: Essential Knowledge:**

Comprehensive discipline knowledge and understanding of computer functionality various uses of applications, computer science involved in basic application working to creation and to apply their knowledge in practice.

**PO2: Creative and critical thinking and problem-solving abilities:**

Be effective problem solvers, able to apply critical and evidence-based thinking and to put in front the programming challenges in computer science and to conceive innovative responses to future challenges.

**PO3: Teamwork and communication skills:**

Be able to convey ideas and information effectively to a range of audiences for a variety of purposes and contribute in a positive and collaborative manner to achieving goals.

**PO4: Professionalism and leadership readiness:**

Be able to engage in professional behavior and have the potential to take leadership roles in their chosen occupations and communities.

**PO5: Intercultural and ethical competency:**

Be responsible and effective global citizens whose personal values and practices are consistent with their roles as responsible members of society.

**PO6: Social responsibility:**

Be sensitive to and demonstrate experimental evidence which does not affect society.

**SPECIFIC PROGRAM OUTCOMES FOR  
B. Com (COMPUTER APPLICATIONS)**

- SPO1:** A student should be able to recall basics concepts in computers and should be able to work or operate.
- SPO2:** A student should get adequate exposure to global and local concerns that explore many aspects of computer science & applications.
- SPO3:** Student is equipped with creative talent and power of communication necessary for various kinds of employment.
- SPO4:** Student should be able to apply their skills and knowledge in practical's.
- SPO5:** Enabling students to develop a positive attitude towards programming languages as an interesting & valuable subject of study.
- SPO6:** Think in a critical manner.
- SPO7:** Acquire good knowledge and understanding in advanced areas of computer science & applications chosen by the student from the given courses.
- SPO8:** The skills and knowledge gained have intrinsic beauty, which also leads to proficiency. This can be utilized in modelling and solving real-life problems.
- SPO9:** To recognize patterns and to distinguish between essential and irrelevant aspects of problems.
- SPO10:** Ability to share ideas and insights while seeking and benefiting from knowledge and insight of others. This helps them to learn to behave responsibly in a rapidly changing interdependent society.
- SPO11:** This Program will also help students to enhance their employability for jobs in research institutes, IT origination and teaching fields, scientific data analyst and in various other public and private companies.



### **SEM-I Fundamental of information technology**

After the completion of the course, Students will be able to

CO1 Identify the components of computers and analyze the basic concepts of operating systems.

CO2 Interpret the basic concepts of Information Systems

CO3 Extract the knowledge of Multimedia concepts.

CO4 Execute online transactions through Internet.

CO5 Analyze office management applications

### **SEM-II C & C++ Programming**

After the completion of the course, Students will be able to

CO1: an ability to incorporate exception handling in object-oriented programs.

CO2: an ability to use template classes and the STL library in C & C++.

CO3: an understanding of the concepts of OOPs including inheritance and polymorphism.

CO4: an ability to overload operators in C & C++.

CO5: an understanding of the difference between function overloading and function overriding.

### **SEM-II Basic Computer Skills (AECC -2)**

After the completion of the course, Students will be able to

CO1: Understanding the concept of input and output devices of Computers.

CO2: Learn the functional units and classify types of computers, how they process information and how individual computers interact with other computing systems and devices.

CO3: Understand an operating system and its working, and solve common problems related to operating systems.

CO4 : Learn basic word processing, Spreadsheet and Presentation Graphics Software skills.

CO5: Study to use the Internet safely, legally, and responsibly.

### **SEM-III Relational Database management system**

After the completion of the course, Students will be able to

CO1: Understand the normalization of databases through various case studies.

CO2: Use of query optimization techniques, backup and recovery features of database management software.

CO3: Create a new database and administer the database management software.

CO4: Develop different web databases and object-oriented database management system.

CO5: Describe the usage of data mining tools.

### **SEM-IV Web Technology**

After the completion of the course, Students will be able to:

CO1: Explain the history of the internet and related internet concepts that are vital in understanding web development.

CO2: Discuss the insights of internet programming and implement complete application over the web.

CO3: Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet.

CO4: Utilize the concepts of JavaScript

### **SEM-V E commerce**

<p>After the completion of the course, Students will be able to</p> <p>CO1: To learn electronic commerce.  CO2: To learn business needs world trade system.  CO3: To handle E commerce product and applications.  CO4: To create the best e commerce business.  CO5: To study various factor, involve in ecommerce business app.</p>
<p style="text-align: center;"><b>SEM-V INFORMATION TECHNOLOGIES (GE)</b></p>
<p>After the completion of the course, Students will be able to</p> <p>CO1: Design and develop software solutions for contemporary business environments by employing appropriate problem-solving strategies.  CO2: Configure and administer database servers to support contemporary business environments.CO3: Comprehend and resolve common desktop and network issues.  CO4: Analyze common business functions and identify, design, and develop appropriate information technology solutions (in web, desktop, network, and/or database applications).  CO5: Learn future technologies through acquired foundational skills and knowledge and employ them in new business environments.  CO6: Practice communication, problem solving and decision-making skills using appropriate technology and with the understanding of the business environment.</p>
<p style="text-align: center;"><b>SEM -VI Cyber Security</b></p>
<p>After the completion of the course, Students will be able to:</p> <p>CO1: Explain the history of the internet and related internet concepts that are vital in understanding and its threats.  CO2: Discuss the insights of internet and implement complete security threat handling concepts.  CO3: Demonstrate the importance of cyber laws and security protocol.  CO4: Utilize the concepts of encryption of messages in web.</p>

**DEPARTMENT OF BIOCHEMISTRY**  
**B.Sc- Mb.Bc.C and Bt.Mb.C**

**DEPARTMENT OF BIOTECHNOLOGY**  
**B.Sc- Mb.Bc.C and Bt.Mb.C**

<b>PROGRAMME OUTCOMES</b>
<p><b>At the end of the programme students will have:</b></p> <p><b>PO1: Essential Knowledge:</b></p> <p>Comprehensive discipline knowledge and understanding of biological mechanisms, chemistry involved in living creatures from unicellular organisms to humans and to apply their knowledge in practical.</p> <p><b>PO2: Creative and critical thinking and problem solving abilities:</b></p> <p>Be effective problem solvers, able to apply critical and evidence-based thinking and to put in front the experiential evidences in life sciences and to conceive innovative responses to future challenges.</p> <p><b>PO3: Teamwork and communication skills:</b></p> <p>Be able to convey ideas and information effectively to a range of audiences for a variety of purposes and contribute in a positive and collaborative manner to achieving goals.</p> <p><b>PO4: Professionalism and leadership readiness:</b></p> <p>Be able to engage in professional behaviour and have the potential to take leadership roles in their chosen occupations and communities.</p> <p><b>PO5: Intercultural and ethical competency:</b></p> <p>Be responsible and effective global citizens whose personal values and practices are consistent with their roles as responsible members of society.</p> <p><b>PO6: Social responsibility:</b></p> <p>Be sensitive to and demonstrate experimental evidences which does not effect the society.</p>

**SPECIFIC PROGRAM OUTCOMES FOR**  
**B Sc. BIOCHEMISTRY**

- SPO1:** A student should be able to recall basics about concepts in life sciences and should be able to display knowledge of conventions such as, terminology.
- SPO2:** A student should get adequate exposure to global and local concerns that explore them many aspects of life sciences.
- SPO3:** Student is equipped with creative talent and power of communication necessary for various kinds of employment.
- SPO4:** Student should be able to apply their skills and knowledge in practical's.
- SPO5:** Enabling students to develop a positive attitude towards microorganisms as an interesting and valuable subject of study.
- SPO6:** Think in a critical manner.
- SPO7:** Acquire good knowledge and understanding in advanced areas of life sciences chosen by the student from the given courses.
- SPO8:** The skills and knowledge gained has intrinsic beauty, which also leads to proficiency. This can be utilized in modelling and solving real life problems.
- SPO9:** To recognize patterns and to distinguish between essential and irrelevant aspects of problems.
- SPO10:** Ability to share ideas and insights while seeking and benefitting from knowledge and insight of others. This helps them to learn behave responsibly in a rapidly changing interdependent society.
- SPO11:** This Program will also help students to enhance their employability for jobs in research institutes, pharma companies and teaching fields, scientific data analyst and in various other public and private companies.



## DEPARTMENT OF BIOCHEMISTRY

<b>SEM-I CHEMISTRY OF BIOMOLECULES</b>	
<p>After the completion of the course, Students will be able to</p> <p>CO1: understand the scope of biochemistry            CO2: what are buffers, pH, stereochemistry of carbohydrates and amino acids            CO3: what are carbohydrates its types, and their importance            CO4: what are lipids, their types and importance            CO5: what are amino acids, types and their importance</p>	
<b>SEM-II CHEMISTRY OF NUCLEIC ACIDS AND BIOCHEMICAL TECHNIQUES</b>	
<p>After the completion of the course, Students will be able to</p> <p><b>CO1:</b> Understand composition and nature of nucleic acids            CO2: structure of nucleic acids, about DNA, types of RNA, kinetics of nucleic acids            CO3: spectrophotometry, centrifugation and its types            CO4: what is chromatography and various types of chromatography techniques</p>	
<b>SEM-III ENZYMOLOGY, CARBOHYDRATE AND LIPID METABOLISM</b>	
<p>After the completion of the course, Students will be able to</p> <p><b>CO1.</b> classification of enzymes, methods of enzyme purification, enzyme substrate interactions, enzyme units            CO2: enzyme kinetics and enzyme action, enzyme inhibition, enzyme activity, zymogen activation, isoenzymes.            CO3: carbohydrate metabolism            CO4: lipid metabolism</p>	
<b>SEM-IV AMINO ACID, NUCLEIC ACID METABOLISM, BIOENERGETICS AND BIOLOGICAL OXIDATION</b>	
<p>➤ <b>CO1:</b> amino acid metabolism and disorders.            ➤ <b>CO2:</b> nucleic acid metabolism and disorders.            ➤ <b>CO3:</b> learn about bioenergetics            ➤ <b>CO4:</b> Learn about biological oxidation, ETC, oxidative phosphorylation, ROS            ➤ <b>CO5:</b> ultrastructure and function of chloroplast, cyclic and non cyclic phosphorylation.</p>	

<b>SEM-III SEC I -BASICS IN BIOCHEMICAL CALCULATIONS AND BIOSTATISTICS</b>
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After the completion of the course, Students will be able to

**CO1:** Learn basic biochemical calculations, units and measurements, pH, buffers, construction of calibration curve and absorption maxima

**CO2:** basic statistical concepts, measures of central tendency, measures of dispersion, .

**CO3: depiction of data by graphical methods, t-Test**

**CO4:** regression and correlation , precision and accuracy, ANOVA.

#### **SEM-IV SEC III APPLIED AND COMPUTATIONAL BIOCHEMISTRY**

After the completion of the course, Students will be able to

**CO1:** Homogenization ,centrifugation techniques, enzyme and protein purification methods

**CO2:** computational science and applications, software packages in docking designing

**CO3: molecular modeling-drug designing, drug-biomolecule, receptor-biomolecule interactions,application in enzyme kinetics**

**CO4:** KEGG, gene identification,protein data bank

#### **SEM -V PHYSIOLOGY, NUTRITION AND CLINICAL BIOCHEMISTRY (DSE I)**

After the completion of the course, Students will be able to

**CO1:** Human physiology, digestion, cardiac cycle, physiology of vision , muscles,structure of heart, neuron and propagation of nerve impulse

**CO2:** different types and endocrine glands , functions, importance and disorders

Nutrition ( balance diet, SDA of foods, BMR,BMI,RDA,foods and their nutrition)

**CO3:** malnutrition,vitamins,trace elements, obesity

**CO4:** organs and organ function tests

**CO5:** LFTs, RFTs, biochemical tests for heart diseases

#### **SEM -V CELL BIOLOGY AND GENETICS (DSE II)**

After the completion of the course, Students will be able to

**CO1:**ultrastructure of prokaryotes and eukaryotes, chromosomes

**CO2: mitosis,cell cycle and cell death**

**CO3:** basics of genetics

**CO4:** Understands concept of gene therapy.

**CO5: mutations, mutagens.**

**CO6 :**classification of microorganisms, isolation and cultivation , Grams's staining

**CO7 :** industrial uses of A.niger, yeast,spirulina,structure and composition of virus, viral life cycle

CO8:TMV ,HIV, PFU, one step growth.
<b>SEM -V GE BIOCHEMISTRY AND PHYSIOLOGY</b>
<p>After the completion of the course, Students will be able to</p> <p>: CO1:what are buffers, pH ,stereochemistry of carbohydrates and amino acids  CO2: what are carbohydrates,lipids, amino acids, nucleic acids its types,and their importance,enzymes,vitamins  CO3: what are carbohydrates,lipids, amino acids, nucleic acids metabolism and disorders  CO4: human physiology and endocrine system</p>
<b>SEM-VI : MOLECULAR BIOLOGY AND IMMUNOLOGY</b>
<p>After the completion of the course, Students will be able to</p> <p><b>CO1:</b> DNA replication,enzymes of replication ,inhibitors of replication.</p> <p>➤ <b>CO2:</b> transcription,promoters,initiation, elongation,termination.  <b>CO3:</b> post transcriptional modification,inhibitors of RNA synthesis  <b>CO4:</b> translation , genetic code, protein synthesis, post translational modifications  <b>CO5:</b> inhibitors of translation, lac operon  organization of immune system, organs and cells of immune system  CO6:classification of immunoglobulins ,haptens, epitopes, adjuvants, monoclonal antibodies  CO7:antigen-antibody reactions, blood group antigens, RIA,ELISA  CO8: vaccines, morden vaccines,outlines of hypersensitivity, graft rejection and MHC</p> <p><b>SEM-VI :r-DNA TECHNOLOGY AND BIOTECHNOLOGY – OPTIONAL B</b></p> <p>After the completion of the course, Students will be able to</p> <p>CO1:cloning strategy, DNA sequencing, r-DNA technology enzymes, restriction mapping.  CO2: cloning vectors,molecular markers  CO3: c-DNA libraries, PCR, blotting techniques, production of insulin GH,Bt cotton, edible vaccines  CO4:plant and animal biotechnology  CO5:microbial and environmental biotechnology.</p>
<b>SEM-VI :BIOCHEMISTRY IN HEALTH AND DISEASE – OPTIONAL II</b>
<p>After the completion of the course, Students will be able to</p> <p><b>CO1:metabolic disorders</b>  <b>CO2:</b> genetic disorders  <b>CO3:</b> endocrine disorders  <b>CO4: molecular basis of cancer</b></p>



**DEPARTMENT OF BIOTECHNOLOGY**  
**B.Sc- Mb.Bc.C and Bt.Mb.C**

**PROGRAMME OUTCOMES**

**At the end of the programme students will have:**

**PO1: Essential Knowledge:**

Comprehensive discipline knowledge and understanding of biological mechanisms, chemistry involved in living creatures from unicellular organisms to humans and to apply their knowledge in practical.

**PO2: Creative and critical thinking and problem solving abilities:**

Be effective problem solvers, able to apply critical and evidence-based thinking and to put in front the experiential evidences in life sciences and to conceive innovative responses to future challenges.

**PO3: Teamwork and communication skills:**

Be able to convey ideas and information effectively to a range of audiences for a variety of purposes and contribute in a positive and collaborative manner to achieving goals.

**PO4: Professionalism and leadership readiness:**

Be able to engage in professional behaviour and have the potential to take leadership roles in their chosen occupations and communities.

**PO5: Intercultural and ethical competency:**

Be responsible and effective global citizens whose personal values and practices are consistent with their roles as responsible members of society.

**PO6: Social responsibility:**

Be sensitive to and demonstrate experimental evidences which does not effect the society.

**SPECIFIC PROGRAM OUTCOMES FOR**  
**B Sc. BIOTECHNOLOGY**

- SPO1:** A student should be able to recall basics about concepts in life sciences and should be able to display knowledge of conventions such as, terminology.
- SPO2:** A student should get adequate exposure to global and local concerns that explore them many aspects of life sciences.
- SPO3:** Student is equipped with creative talent and power of communication necessary for various kinds of employment.
- SPO4:** Student should be able to apply their skills and knowledge in practical's.
- SPO5:** Enabling students to develop a positive attitude towards microorganisms as an interesting and valuable subject of study.
- SPO6:** Think in a critical manner.
- SPO7:** Acquire good knowledge and understanding in advanced areas of life sciences chosen by the student from the given courses.
- SPO8:** The skills and knowledge gained has intrinsic beauty, which also leads to proficiency. This can be utilized in modelling and solving real life problems.
- SPO9:** To recognize patterns and to distinguish between essential and irrelevant aspects of problems.
- SPO10:** Ability to share ideas and insights while seeking and benefitting from knowledge and insight of others. This helps them to learn behave responsibly in a rapidly changing interdependent society.
- SPO11:** This Program will also help students to enhance their employability for jobs in research institutes, pharma companies and teaching fields, scientific data analyst and in various other public and private companies.

## DEPARTMENT OF BIOTECHNOLOGY

### SEM-I CELL BIOLOGY AND GENETICS

After the completion of the course, Students will be able to

- C01: Understand cell as basic unit of life .**
- C02: Learn and differentiate between the structure of prokaryotic and eukaryotic cell.
- C03: Understand cell division in prokaryotes and eukaryotes.
- C04: Learn cell death mechanisms.
- C05: Revise Mendelian mechanisms of inheritance.
- C06: Understand deviation from Mendel's laws
- C07: Learn Extension to Mendel's laws

### SEM-II BIOLOGICAL CHEMISTRY AND MICROBIOLOGY

After the completion of the course, Students will be able to

- C01:** Understand importance, structure and classification of biomolecules
- C02: Learn bioenergetics of cell with important cycles.**
- C03:** Learn the concepts microscopy.
- C04: Learn the classification and structure of different microorganisms.
- C05: Understand the sterilization methods.
- C06: Learn the techniques for culturing and identification of microorganisms.

### SEM-III MOLECULAR BIOLOGY AND RECOMBINANT DNA TECHNOLOGY

After the completion of the course, Students will be able to

- C01:** Understand Structure of gene – prokaryotic and eukaryotic.
- C02: Understand expression of genes – prokaryotes and eukaryotes.
- C03: Understand Regulation of gene expression.
- C04: Know about enzymes required in recombinant DNA technology.
- C05: Learn about different vectors required for rDNA technology.
- C06: Learn about applications of rDNA technology.

### SEM-IV BIOINFORMATICS AND BIOSTATISTICS

- **C01:** Understand the historical development of bioinformatics.
- **C02:** learn the tools and databases in bioinformatics.
- **C03:** Learn the basics of sequence alignment and scoring matrices
- C04:** Learn the basic terms in biostatistics
- C05:** Understand the calculation of measures of central tendency and measures of dispersion.
- C06:** Learn the different applications of biostatistics.

<b>SEM-III SEC I -INDUSTRIAL FERMENTATION</b>
<p>After the completion of the course, Students will be able to</p> <p><b>C01: Learn the procedures for production of industrial chemicals</b>  <b>C02:</b> Learn about the production of biochemicals and therapeutic products .  <b>C03:</b> Learn about the purification pf proteins.  <b>C04:</b> Understands about Learn about the microbial products of pharmacological interest</p>
<b>SEM-III SEC II- IMMUNOLOGICAL TECHNIQUES</b>
<p>After the completion of the course, Students will be able to</p> <p><b>C01: Understands about antigen antibody reactions.</b>  <b>C02:</b> Understand antibody assays.  <b>C03:</b> Learn different cellular assays with human peripheral blood.  .</p>
<b>SEM-IV SEC III MOLECULAR MARKERS IN PLANT BREEDING</b>
<p>After the completion of the course, Students will be able to</p> <p><b>C01 :</b> Understands about Molecular markers in plant breeding.  <b>C02:</b> Understand marker assisted selection for plant breeding.  <b>C03:</b> Understand the marker assisted backcrossing.  <b>C04:</b> Find out improved varieties using MAS</p>
<b>SEM – IV SEC IV DRUG DESIGNING</b>
<p>After the completion of the course, Students will be able to</p> <p><b>C01 :</b> Learn about historical perspective and challenges in drug discovery.  <b>CO2:</b>Learn Bioinformatic prediction of 3D structure of protein .  <b>CO3:</b>Learn about the structure based drug designing.  <b>CO4 :</b> Learn the strategies of drug designing.  <b>CO5:</b> Understand the concept of pharmacogenomics.</p>

### **SEM -V PLANT BIOTECHNOLOGY (DSE I)**

After the completion of the course, Students will be able to

- **C01:** Understand basic requirement of plant tissue culture media and preparation of media.
- **C02:** Learn about callus culture and organogenesis and embryogenesis.
- C03:** Understands about applications plant tissue culture.
- C04:** Learn the concept of transgenic plants.
- C05:** Know about applications of transgenic plants.

### **SEM -V MEDICAL BIOTECHNOLOGY (DSE II)**

After the completion of the course, Students will be able to

- C01:** Understands about different methods for diagnosis of human diseases.
- C02:** Understand about the chromosomal disorders due to different chromosomal abnormalities
- C03:** Knows about mitochondrial disorders.
- C04:** Understands concept of gene therapy.
- C05:** Learn about stem cells and stem cell based therapies.

### **SEM -V GE BASICS IN BIOTECHNOLOGY**

After the completion of the course, Students will be able to

- CO1:** Understand basics in plant biotechnology.
- CO2:** Learn the basics of microbial and industrial biotechnology
- CO3:** Know the basics of animal medical biotechnology
- CO4:** Understands Computer applications of biotechnology.

### **SEM-VI :IPR, BIOSAFETY AND ENTREPRENEURSHIP ELECTIVE AGAINST PROJECT**

After the completion of the course, Students will be able to

- C01 :** In detail know about IPR, its types. Trademark , Copyrights , Patents, Geographical indications and International organizations
- C02:** Understands Plant varieties protection, animal breeders right, patenting microbes and organisms, patenting genes, markers and Variants.
- C03:** processing of Patents.

### **SEM-VI : ANIMAL BIOTECHNOLOGY – OPTIONAL II A**

After the completion of the course, Students will be able to

- C01 :** Understand the animal cell lines, genetic manipulations of cells.
- C02 :** Understand commercial applications of cell culture.
- C03 :** Know about model organisms and their significance.
- CO4:** Understand about DNA micromanipulation.
- CO5:** Understand development in molecular markers.

<b>SEM-VI : ENVIRONMENTAL BIOTECHNOLOGY – OPTIONAL II B</b>
After the completion of the course, Students will be able to
<b>C01: Understand</b> Concept of pollution, types and sources
<b>C02: Learn about types of pollutants</b>
<b>C03: Understand</b> concept of Global warming and green house gases and its effect
<b>CO4:</b> Know about Impact of pollution on environment and different monitoring methods of pollution
<b>CO5:</b> Learn about Impact of pollution on environment and different monitoring methods of pollution.
<b>C06: Understand Solid and Liquid</b> waste management and treatment methods
<b>C07:</b> Understand Concept of Bioremediation of inorganic compounds like pesticides using microbes.
<b>C08: Know</b> Phytoremediation and Xenobiotics
<b>C09:</b> Understand Biodiversity types and its Conservation methods .

## DEPARTMENT OF CHEMISTRY

### PROGRAMME OUTCOMES

#### PROGRAMME: B.Sc. CHEMISTRY

#### PROGRAMME OUTCOMES

**PO-1:** B.Sc. Chemistry curriculum is so designed to provide the students a comprehensive understanding about the fundamentals of chemistry covering all the principles and perspectives.

**PO-2:** The branches of chemistry such as Organic Chemistry, Inorganic Chemistry, Physical Chemistry, Analytical Chemistry and Medicinal Chemistry expose the diversified aspects of chemistry where the students experience a broader outlook of the subject.

**PO-3:** The Syllabi of the B.Sc. Chemistry course are discretely classified to give stepwise advancement of the subject knowledge right through the three years of the term.

**PO-4:** The practical exercises done in the laboratories impart the students the knowledge about various chemical reagents and reactions. Thereby, hone their skills of handling the corrosive, poisonous, explosive, and carcinogenic chemicals making themselves employable in any kind of chemical industries. They are also trained about the adverse effects of the obnoxious chemicals and the first aid treatment.

#### PROGRAMME SPECIFIC OUTCOMES

**PSO-1:** The students will understand the reactions, types and applications of different types of inorganic compounds.

**PSO-2:** Students will learn to estimate inorganic salt mixtures and organic compounds both qualitatively and quantitatively using the classical methods of analysis in practical classes.

**PSO-3:** Students will grasp the mechanics of different types of reactions both organic and inorganic and will try to predict the products of unknown reactions.

**PSO-4:** Students will learn to synthesize the chemical compounds by maneuvering the addition of reagents under optimum reaction conditions.

## DEPARTMENT OF CHEMISTRY

SEM-I
<p><b>CO1:</b> To know about the compounds of B,C,N and P.</p> <p><b>CO2:</b> To understand the reactions involved in salt analysis.</p> <p><b>CO3:</b> To know the basic concepts of organic chemistry.</p> <p><b>CO4:</b> To learn the basic concepts of organic chemistry specially on preparation and properties of Hydrocarbons.</p> <p><b>CO-5:</b> To study the qualitative analysis of salts.</p>
SEM-II
<p>CO-1: To know about the different types of oxides of elements, oxy acids and their structure, Halogens and their compounds.</p> <p>CO-2: To understand about Zero group elements and the structure of their oxides and halides.</p> <p>CO-3: To know about d-block elements and their characteristic properties, study of triads.</p> <p>CO-4: To learn about the Nucleophilic substitution reactions with examples and their stereochemistry.</p> <p>CO-5: To know about the types of alcohols and phenols with their preparation and chemical properties.</p> <p>CO-6: To know about the preparation of ether and their properties.</p> <p>CO-7: To understand the nature of carbonyl compounds, identification tests of aldehydes and ketones with their chemical reactions, oxidation and reduction reactions of carbonyl compounds.</p> <p>CO-8: To gain vast knowledge on Electrochemistry, Laws of electrochemistry, Kohlrausch's law, transport numbers, EMF, types of electrodes and applications of EMF.</p> <p>CO-9: To learn about the types of titrations, theory of acid base indicators, different types of indicators, steps involved in gravimetric analysis.</p> <p>CO-10: To know about the plane polarized light, optical activity, optical isomerism, D,L-Configuration, R-S-Configurations.</p> <p>CO-11: To learn about the colligative properties, their determination</p>
SEM-III
<p>CO-1: To learn about the oxides of different elements, Halogen compounds.</p> <p>CO-2: To understand the f-block elements and their properties, Isomerism in coordination compounds.</p> <p>CO-3: To know the concepts, types, reaction mechanism and examples of organic substances.</p> <p>CO-4: To learn about the basic concepts of Thermodynamics, Laws Of Thermodynamics, Entropy and Numerical problems related to them, thermodynamic relationships and system of variables and compositions.</p> <p>CO-5: To know about the Free electron theory, conductors, semiconductor and insulator, Types of semiconductors.</p> <p>CO-6: Definition of Carbanions and reactions and their mechanisms in which carbanions are involved.</p>



CO-7: Definition, terms involved in phase, to know about the different types of systems. To learn about the synthesis of organic compounds and classification of different functional groups of organic molecules.	
<b>SEM-IV</b>	
CO-1: To know about crystal field theory, splitting of d-orbitals in square planar, tetrahedral and octahedral geometry, different properties of metal complexes, determination of composition of metal complexes, applications of metal complexes/ CO-2: to understand the concept of HSAB principle, and its applications. CO-3: To learn the biological significance of metals, fixation of CO <sub>2</sub> , electron transport CO-4: To understand about the structure of glucose, fructose, interconversion of monosaccharides. CO-5: To learn about the types of amino acids, their properties and nomenclature of peptides. CO-6: To understand in detail about heterocyclic compounds, their preparation and properties. CO-7: To learn in detail about rate, rate constants, order of reaction with examples, determination of order of reactions. CO-8: to know about the laws of photochemistry, Jablonski diagram, CO-9: to learn about the types of errors. And problems based on mean, range etc. CO-10: To learn about the synthetic applications of acetoacetic, malonic ester. CO-11: To understand about the types of colloids, their properties, types of and types of adsorptions.	
<b>SEM-5: PAPER-V</b>	<b>SPECTROSCOPY &amp; CHROMATOGRAPHY</b>
After the completion of the course, Students will be able to	
<b>CO-1:</b> To understand in detail about types of molecular spectroscopy, selection rules, types of electronic transitions, terminology, Beer-Lambert's law, upscutation of UV unable spectra, vibration modes in polyatomic molecules, absorption bands of various functional groups. <b>CO- 2:</b> To learn about the principle involved in NMR, Mass spectra, types of p+, spin splitting, N <sub>2</sub> rule, Types of peaks, , H-NMR spectrum and mass spectrum of compounds. <b>CO- 3:</b> To Know about the Nernst distribution law, types of extraction methods. to learn about the types of chromatographic methods, principle, stationary, mobile phase involved in TLC, types of paper chromatography and their applications. <b>CO-4:</b> To know about the types of column chromatography, calculation of R <sub>f</sub> value, types of ion-exchange chromatography with examples, columns usual in Gas chromatography, significance of carrier gas, types of high performance liquid chromatography., stationary phases used in it and their applications	
<b>SEM-: 6 PAPER-VI</b>	<b>MEDICINAL CHEMISTRY</b>
After the completion of the course, Students will be able to	
CO-1: To know about the characteristics of ideal drug, terms used, nomenclature of drugs, formulations of drugs, ADME factors of drugs. CO-2: To study in detail about the enzyme activity, enzyme inhibitions, drug-action receptor theory, Binding roles of -OH, -NH <sub>2</sub> groups, structure activity relationship of drug molecules. CO-3: To learn about the synthesis, therapeutic activity of some important drugs. CO-4: To learn about the neurotransmitters, their significance, Hormones, types of Vitamins, deficiency disorders of vitamins	

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## **DEPARTMENT OF HHTS**

### **B. Vocation**

### **HOSPITALITY & TOURISM ADMINISTRATION**

#### **PROGRAMME OUTCOMES: HOSPITALITY & TOURISM ADMINISTRATION**

1. To get a thorough understanding of the components of tourism industry and to acquire knowledge and information pertaining to tourism industry.
2. To help students acquire practical skills in all the major arenas of the industry.
3. To orient and equip students with Travel Management skills of the age.
4. To develop hospitality culture and behavior and to enhance student competencies.
5. To develop entrepreneurial skills among students

#### **PROGRAM SPECIFIC OUTCOMES( PSOs)**

- PSO1. Getting an exposure to the fundamental concepts and theories in acquiring skills for different aspects of tourism.
- PSO2. Understand the behaviour of Indian and world Tourism
- PSO3. Promote students to become professionals in the field of Tourism
- PSO4. Improve proficiency in applying various skills and enhance employability

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## COURSE OUTCOMES

### SEMESTER-I

#### **B.V.105 : FUNDAMENTAL OF TOURISM ( PAPER I)**

CO1	To understand the concept of tourism	Understand
CO2	To Analyze the new areas of Tourism.	Understand
CO3	To examine the various aspects and organizations related to Tourism.	Understand
CO4	Develop idea about principles and practices of Tourism	Understand
CO5	To identify career opportunities in Tourism	Understand

#### **B.V.106 : FUNDAMENTAL OF HOSPITALITY ( PAPER II)**

##### **Course Outcomes**

On completing the course the students will be able to gain an understanding of the concepts, related to the hospitality business which helps to possess a career in Hospitality Industry.

CO1	To understand the concept and model of hospitality business	Understand
CO2	To Analyze the process in the hospitality industry.	Understand
CO3	To examine the various activities in the hospitality industry.	Apply
CO4	Develop various skills in the hospitality industry like guest handling.	Apply
CO5	Facilitate the most effective action to take in investment to secure their life and personal belongings	Apply

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## SKILL COMPONENT PRACTICAL

### B.V 107: MEET & GREET OFFICER ( PAPER I)

CO1	Plan for meeting customers	Understand
CO2	Prepare for meeting customers & Check preparation	Understand
CO3	check assigned duties as per duty roster	Apply
CO4	check the travel and bookings details of the customer along with Relevant documentation as per travel and bookings details	Apply
CO5	Different states, their capitals, the attractions/heritage/monuments of each state	Apply

### B.V 108: MEET & GREET OFFICER ( PAPER II)

CO1	read and interpret instructions, procedures, information, and signs relevant to travel and tourism	Understand
CO2	To Analyze the process in the hospitality industry.	Understand
CO3	Interpret and follow operational instructions and prioritize work.	Apply
CO4	Develop various skills in the hospitality industry like guest handling.	Apply
CO5	documents, airlines schedules, itineraries, other legislations etc. applicable to the job in English and/or the local language	Apply

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## SEMESTER-II

### **B.V 201 INDIAN CULTURE &HERITAGE (PAPER-I)**

CO1	To familiarize the students with the basic understanding of tourism resources.	Knowledge
CO2	To understand the various typologies of tourism resources	Understand
CO3	To acquire knowledge about archaeological sites in India such as monuments , Temples , Pilgrim Centres, Forts ,Palaces and Museums , Buddhist heritage sites , Familiarizing the important natural tourism products of India such as Hill stations, Beaches etc	Application
CO4	Familiarize the social and cultural setup in India and its contribution to tourism	Analysis
CO5	Imparting knowledge about cultural tourism resources of India	Synthesis

### **B.V 205 TOURISM PRODUCTS (PAPER-II)**

CO1	To familiarize different types of tourism products in India.	Understand
CO2	To understand the cultural tourism resources in India.	Understand
CO3	To provide knowledge about the Products and Resources in Tourism Industry	Understand
CO4	To understand the nature of different tourism products	Understand
CO5	To familiarize the social and cultural setup in India and its contribution to tourism	Understand

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## **B.V 206 FOUNDATION COURSE IN FRONT OFFICE (PAPER-III)**

CO1	To understand the concept and model of hospitality business	Understand
CO2	To Analyze the process in the hospitality industry.	Understand
CO3	To examine the various activities in the hospitality industry.	Apply
CO4	Develop various skills in the hospitality industry like guest handling.	Apply
CO5	Facilitate the most effective action to take in investment to secure their life and personal belongings	Apply

### **SKILL COMPONENT PRACTICAL**

## **B.V 207: FRONT OFFICE EXECUTIVE -I (PAPER I)**

CO1	greeting clients and setting a positive office atmosphere	Understand
CO2	Answering the phone, taking messages, and redirecting calls to respective offices	Understand
CO3	organizing and maintaining files and records and updating them when necessary	Apply
CO4	overseeing the sorting and distribution of incoming mail	Apply
CO5	Facilitate the most effective action to take in investment to secure their life and personal belongings	Apply

## **B.V 208: FRONT OFFICE EXECUTIVE -II (PAPER II)**

CO1	To understand the concept and model of hospitality business	Understand
CO2	overseeing the sorting and distribution of incoming mail	Understand
CO3	To examine the various activities in the hospitality industry.	Apply
CO4	Develop various skills in the hospitality industry like guest handling.	Apply
CO5	documents, airlines schedules, itineraries, other legislations etc. applicable to the job in English and/or the local language	Apply

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## SEMESTER-III

### B.V 301 TOURISM GEOGRAPHY (PAPER-I)

CO1	The students will be knowing about the concept of Geography and its essential background, against which tourism places are created and environmental impacts and concerns are major issues, that must be considered in managing the development of tourism places	Understand
CO2	Demonstrate an understanding of various countries in the world	Understand
CO3	To examine tourism potentials in the world.	Apply
CO4	The students will be measuring and calculating different time zones and tourism patter	Apply
CO5	Identify the need for familiarizing Map study and Map marking	Apply

### B.V 304 TOURISM MARKETING (PAPER-I)

CO1	To understand the concept and model of marketing business	Understand
CO2	To Analyze the process in the Tourism marketing	Understand
CO3	To examine the various activities in the marketing field	Apply
CO4	Develop various skills to market different tourism products	Apply
CO5	Facilitate the most effective action to take in investment to secure their life and personal belongings	Apply

### B.V 305 FOUNDATION COURSE IN FRONT OFFICE (PAPER-III)

CO1	To understand the concept and model of hospitality business	Understand
CO2	To Analyze the process in the hospitality industry.	Understand
CO3	To examine the various activities in the hospitality industry.	Apply
CO4	Develop various skills in the hospitality industry like guest handling.	Apply
CO5	Facilitate the most effective action to take in investment to secure their life and personal belongings	Apply

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## **SKILL COMPONENT PRACTICAL**

### **B.V 306 TRAVEL CONSULTANT (PAPER I)**

CO1	To understand the concept and model of hospitality business	Understand
CO2	To Analyze the process in the hospitality industry.	Understand
CO3	To examine the various activities in the hospitality industry.	Apply
CO4	Develop various skills in the hospitality industry like guest handling.	Apply
CO5	Facilitate the most effective action to take in investment to secure their life and personal belongings	Apply

### **B.V 307 HOSPITALITY ASSISTANT ( PAPER II)**

CO1	To understand the concept and model of hospitality business	Understand
CO2	To Analyze the process in the hospitality industry.	Understand
CO3	To examine the various activities in the hospitality industry.	Apply
CO4	Develop various skills in the hospitality industry like guest handling.	Apply
CO5	Facilitate the most effective action to take in investment to secure their life and personal belongings	Apply



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## SEMESTER-IV

### B.V 404 ACCOUNTANCY SKILLS FOR TOURISM & HOSPITALITY (PAPER-II)

CO1	To build up an understanding about the conceptual background of double entry system and principles of accounting.	Understand
CO2	Comprehend methods of calculating depreciation charges and to identify the factors to be considered when choosing a depreciation method.	Understand
CO3	Develop the ability through the creation of statements of account for a sole trader/proprietor by making trading account, profit and loss account, and balance sheet.	Apply
CO4	Differentiate and assess the various provisions of maintaining accounts of Branch & Departmental, Consignment & Joint Venture.	Apply
CO5	Know about the accounting of non-profit making organizations and discriminate it with other profit making organizations.	Apply

### B.V 405 TOURISM & HOSPITALITY INSTITUTIONS (PAPER-III)

CO1	To enhance knowledge and skills on the various institutions including trends and contemporary issues in the travel industry.	Understand
CO2	To demonstrate the various state tourism boards influencing the tourism industry including setting up of travel agencies and legal aspects in travel and tour operations.	Understand
CO3	To get knowledge about the various active organizations involved in the active development of travel and tour operations across the globe.	Apply
CO4	To develop knowledge and skills of tour operator's products which includes travel, transfer, and accommodation planning.	Apply
CO5	Get equipped then with skills of how to manage tour and travel related procedures	Apply

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**SKILL COMPONENT PRACTICAL**  
**B.V 406 Guest Relation Manager -II ( PAPER I)**

CO1	To understand the concept and model of hospitality business	Understand
CO2	To Analyze the process in the hospitality industry.	Understand
CO3	To examine the various activities in the hospitality industry.	Apply
CO4	Develop various skills in the hospitality industry like guest handling.	Apply
CO5	Facilitate the most effective action to take in investment to secure their life and personal belongings	Apply

**B.V 407 GUEST RELATION MANAGER -II ( PAPER II)**

CO1	To understand the concept and model of hospitality business	Understand
CO2	To Analyze the process in the hospitality industry.	Understand
CO3	To examine the various activities in the hospitality industry.	Apply
CO4	Develop various skills in the hospitality industry like guest handling.	Apply
CO5	Facilitate the most effective action to take in investment to secure their life and personal belongings	Apply

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**SEMESTER-V**  
**B.V 501 TOURISM ETHICS & LAWS (PAPER-I)**

CO1	To understand the concept and model of hospitality business	Understand
CO2	To Analyze the process in the hospitality industry.	Understand
CO3	To examine the various activities in the hospitality industry.	Apply
CO4	Develop various skills in the hospitality industry like guest handling.	Apply
CO5	Facilitate the most effective action to take in investment to secure their life and personal belongings	Apply

**B.V 502 COMMUNICATION SKILLS FOR TOURISM & HOSPITALITY (PAPER-II)**

CO1	To understand the concept and model of hospitality business	Understand
CO2	To Analyze the process in the hospitality industry.	Understand
CO3	To examine the various activities in the hospitality industry.	Apply
CO4	Develop various skills in the hospitality industry like guest handling.	Apply
CO5	Facilitate the most effective action to take in investment to secure their life and personal belongings	Apply

**B.V 503 HOTEL CAPTAIN (PAPER-III)**

CO1	To understand the concept and model of hospitality business	Understand
CO2	To Analyze the process in the hospitality industry.	Understand
CO3	To examine the various activities in the hospitality industry.	Apply
CO4	Develop various skills in the hospitality industry like guest handling.	Apply
CO5	Facilitate the most effective action to take in investment to secure their life and personal belongings	Apply

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### **B.V 504 EVENT PLANNER (PAPER-IV)**

CO1	To understand the concept and model of hospitality business	Understand
CO2	To Analyze the process in the hospitality industry.	Understand
CO3	To examine the various activities in the hospitality industry.	Apply
CO4	Develop various skills in the hospitality industry like guest handling.	Apply
CO5	Facilitate the most effective action to take in investment to secure their life and personal belongings	Apply

### **B.V 505 TRAVEL AGENCY & TOUR OPERATIONS (PAPER-III)**

CO1	Gaining in-depth knowledge of the history of travel agencies, nature, and form of travel.	Understand
CO2	Build and understanding of functions performed by the Travel agency and tour operator.	Understand
CO3	Comprehends the foundation and organizational structures of travel agencies..	Apply
CO4	Build and understanding of a few important international conventions.	Apply
CO5	Understand and evaluate the legal aspects needs to understand for opening a travel agency.	Apply

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### SKILL COMPONENT PRACTICAL

#### B.V 506 AIRLINE TICKETING AND FARE CONSTRUCTION ( PAPER I)

On completing the course, the students will be able to gain an understanding of the concepts, related to airfares which help to increase the knowledge about air ticketing.

CO1	Define the mechanism of airfare and ticketing	Knowledge
CO2	Explain different types of airfares	Understand
CO3	Prepare air tickets using CRS	Application
CO4	Evaluate the uses and application of information technology in the field of the airline industry	Analysis
CO5	Compile the regulations and formalities of air travel	Synthesis

#### B.V 507 TOURISM OPERATION SOFTWARE SKILLS ( PAPER II)

- On completing the course the students will be able to gain oral and written communication skills in disseminating industrial knowledge.
- Improve proficiency in tour operation business and enhance employability

CO1	To understand the travel agency business Understand	Understand
CO2	Demonstrate an understanding about itinerary preparation.	Understand
CO3	To examine the role and relevance of tour operation	Apply
CO4	Develop various skills in the tour software operations	Apply
CO5	Develop skills for marketing tour Packages	Apply

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## SEMESTER-VI

### B.V 601 TOURISM RESOURCES IN INDIA (PAPER-I)

CO1	To familiarize the students with the basic understanding of tourism resources.	Knowledge
CO2	To understand the various typologies of tourism resources	Understand
CO3	To acquire knowledge about archaeological sites in India such as monuments , Temples , Pilgrim Centres, Forts ,Palaces and Museums , Buddhist heritage sites , Familiarizing the important natural tourism products of India such as Hill stations, Beaches etc	Application
CO4	Familiarize the social and cultural setup in India and its contribution to tourism	Analysis
CO5	Imparting knowledge about cultural tourism resources of India	Synthesis

### B.V 602 HOUSEKEEPING SUPERVISOR (PAPER-II)

CO1	To understand the concept and model of hospitality business	Understand
CO2	To Analyze the process in the hospitality industry.	Understand
CO3	To examine the various activities in the hospitality industry.	Apply
CO4	Develop various skills in the hospitality industry like guest handling.	Apply
CO5	Facilitate the most effective action to take in investment to secure their life and personal belongings	Apply

### B.V 603 ECO-TOURISM (PAPER-III)

CO1	Gaining in-depth knowledge on Ecology, ecosystem and different ecological pyramids.	Understand
CO2	Demonstrate an integrative approach to environmental issues with a focus on sustainability	Understand
CO3	Use critical thinking, problem-solving, and the methodological approaches of the social sciences, natural sciences and humanities in environmental problem solving	Apply
CO4	Develop skills essential to analyze the use of secondary data in assessing the transnational marketing opportunities	Apply
CO5	Understand and evaluate the global scale of environmental problems	Apply

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## **B.V 604 FIELD TOUR-TOURISM RESOURCES IN INDIA (PAPER-IV)**

CO1	To familiarize the students with the basic understanding of tourism resources.	Knowledge
CO2	To understand the various typologies of tourism resources	Understand
CO3	To acquire knowledge about archaeological sites in India such as monuments , Temples , Pilgrim Centres, Forts ,Palaces and Museums , Buddhist heritage sites , Familiarizing the important natural tourism products of India such as Hill stations, Beaches etc	Application
CO4	Familiarize the social and cultural setup in India and its contribution to tourism	Analysis
CO5	Imparting knowledge about cultural tourism resources of India	Synthesis

## **B.V 605 LATEST TRENDS IN HOSPITALITY INDUSTRY (PAPER-V)**

CO1	To understand the concept and model of hospitality business	Understand
CO2	To Analyze the process in the hospitality industry.	Understand
CO3	To examine the various activities in the hospitality industry.	Apply
CO4	Develop various skills in the hospitality industry like guest handling.	Apply
CO5	Facilitate the most effective action to take in investment to secure their life and personal belongings	Apply

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### **SKILL COMPONENT PRACTICAL**

#### **B.V 606 RESERVATION REVENUE MANAGER I ( PAPER I)**

CO1	To understand the concept and model of hospitality business	Understand
CO2	To Analyze the process in the hospitality industry.	Understand
CO3	To examine the various activities in the hospitality industry.	Apply
CO4	Develop various skills in the hospitality industry like guest handling.	Apply
CO5	Facilitate the most effective action to take in investment to secure their life and personal belongings	Apply

#### **B.V 607 RESERVATION REVENUE MANAGER II ( PAPER II)**

CO1	operating office equipment such as photocopiers and printers bookkeeping and issuing invoices	Understand
CO2	performing an inventory of office supplies and order of need	Understand
CO3	recording meeting minutes and dictations	Apply
CO4	Develop various skills in the hospitality industry like guest handling.	Apply
CO5	ensure that travel agents and online booking websites are aware of the promotions	Apply



## DEPARTMENT OF MICROBIOLOGY

<b>SEM-I    GENERAL MICROBIOLOGY-I</b>
<p>After the completion of the course, Students will be able to</p> <p><b>C01:</b> Illustrate the contributions made by prominent scientists.  <b>C02:</b> Analyze different characteristics of microbes and difference of cell wall components in bacteria and archaeobacteria, viruses.  <b>C03:</b> Summarize the techniques used to stain, and observe the microorganism under microscope.  <b>C04:</b> Demonstrate different isolation, preservation techniques.  <b>C05:</b> Analyze various method used for sterilization and disinfection techniques.</p>
<b>SEM-II    MICROBIAL DIVERSITY</b>
<p>After the completion of the course, Students will be able to</p> <p><b>CO1:</b> Analyse different elements of biodiversity- Ecosystem, Genetic, Species abundance,  <b>CO2:</b>classification of living organisms.  <b>CO3:</b>Understand microbial richness, learn characteristics of extremophiles.  <b>CO4:</b>Learn eukaryotic microbial diversity-Algae, fungi and protozoa.  <b>CO5:</b> Analyse microbial ecosystems, cultivation independent methods and learn about sustainable agrosystems.</p>
<b>SEM-3    FOOD AND ENVIRONMENTAL MICROBIOLOGY</b>
<p>After the completion of the course, Students will be able to</p> <p><b>C01:</b> Summarize different fermented foods, dairy products and role of microbes in fermentation of these foods.  <b>C02:</b> Explain the parameters that induce food spoilage, and, process of mycotoxin extraction ,and government regulatory policies followed in manufacturing of fermented foods.  <b>C03:</b> Explain the role of micro flora in water, air and testing the sanitary quality of water and sewage treatment procedures.  <b>C04:</b> Explain the role of micro flora soil, microbes and plant interactions, microbial bioremediation and degradation.</p>
<b>SEM-IV    MEDICAL MICROBIOLOGY AND IMMUNOLOGY</b>
<p>➤ <b>C01:</b> c01:Illustrate the concept of normal flora of human body, air borne diseases, food borne and contact diseases.  ➤ <b>c02:</b>Discuss the various viral and parasitic infections and learn about nosocomial infections.  ➤ <b>c03:</b>Summarize the concepts of cells and organs of immune system, basic structure of antigens and antibodies and types of immunity.  <b>c04:</b>Explain various types of hypersensitivity, types of antigen and antibody reactions.polyclonal and monoclonal antibodies.</p>

<b>SEM-III SEC I -HAEMATOLOGY</b>
<p>After the completion of the course, Students will be able to</p> <p><b>C01:</b> Understands about composition of blood (RBC, WBC, Serum, Platelet cells)</p> <p><b>C02:</b> Learn about staining of blood films.</p> <p><b>C03:</b> Blood preservative methods.</p> <p><b>C04:</b> Understands about general spread of diseases through blood and blood products</p>
<b>SEM-III SEC II-MUSHROOM CULTIVATION</b>
<p>After the completion of the course, Students will be able to</p> <p><b>C01:</b> Understands about history, global status of mushroom cultivation, food value of mushroom</p> <p><b>C02:</b> Steps in mushroom cultivation.</p> <p><b>C03:</b> Pests and pathogens of mushrooms.</p> <p><b>C04:</b> Post harvest handling and preservation of mushrooms.</p>
<b>SEM-V MOLECULAR BIOLOGY AND MICROBIAL GENETICS</b>
<p>After the completion of the course, Students will be able to</p> <p><b>C01:</b> Explain the fundamentals of genetics, structure of DNA, its replication.</p> <p><b>C02:</b> Summarize different mutations, various mutagenic agents, DNA damage and repair.</p> <p><b>C03:</b> Illustrate the concept of gene, types of RNA and their functions and types of genes</p> <p><b>C04:</b> Explain basic principles of genetic engineering. Outline of cloning methods</p>
<b>SEM – V GE MICROBIOLOGY AND HUMAN HEALTH</b>
<p>After the completion of the course, Students will be able to</p> <p><b>C01:</b> Contributions of different scientists, Morphological characteristics of microorganisms and different culture media used.</p> <p><b>C02:</b> Learn different bacterial diseases in humans- Typhoid, Tuberculosis, Syphilis, viral diseases- flu, HIV.</p> <p><b>C03:</b> Understand about vaccines.</p>
<b>SEM -V MICROBIAL OMICS PAPER 5</b>
<p>After the completion of the course, Students will be able to</p> <p><b>C01:</b> Understands about principles of molecular biology</p> <p><b>C02:</b> Concept of genomics, proteomics,</p> <p><b>C03:</b> Knows about mode of action of drugs- cell wall inhibitors</p> <p><b>C04:</b> Understands anti microbial assays</p> <p><b>C05:</b> Drug sensitivity testing methods and their importance.</p>
<b>SEM -VI INDUSTRIAL MICROBIOLOGY PAPER-6</b>
<p>After the completion of the course, Students will be able to</p> <p><b>C01:</b> Introduction to industrial microbiology, screening and selection of industrially useful microbes, strain improvement techniques.</p> <p><b>C02:</b> Illustrate the principles of bioreactors, designs of bioreactors, stages of fermentation</p> <p><b>C03:</b> Summarize the types of fermentations, Advantages and disadvantages of fermentations.</p> <p><b>C04:</b> Explain industrial products derived from microbes, biofuels, disposal of industrial waste.</p>
<b>SEM -VI PHARMACEUTICAL MICROBIOLOGY ELECTIVE-B, PAPER-VI</b>

After the completion of the course, Students will be able to

CO1: Understands about principles of chemotherapy.

CO2: Concept of choice of drugs

CO3: Knows about mode of action of drugs- cell wall inhibitors

CO4: Understands anti-microbial assays

CO5: Drug sensitivity testing methods and their importance

**SEM-6: APPLIED MICROBIOLOGY  
ELECTIVE AGAINST PROJECT**

After the completion of the course, Students will be able to

CO1: Summarize various stain improvement, microorganisms in agriculture, biofertilizers- production and examples.

CO2: Microbial pigments, biotransformation and metabolic engineering of

CO3: Microorganisms to produce compounds.

CO4: Illustrate various methods involved in diagnostic microbiology, preparation and use of culture media, techniques used for diagnosis of hospital.

## DEPARTMENT OF MATHEMATICS

### B.Sc. MATHS

#### PROGRAMME OUTCOMES

- PO1:** Enabling students to develop a positive attitude towards mathematics as an interesting and valuable subject of study.
- PO2:** A student should get a relation ability to pursue advanced studies and research in pure and applied mathematical science.
- PO3:** I understanding of mathematical concepts and concerned structures, and should be able to follow the patterns involved, mathematical reasoning.
- PO4:** Ability to analyze a problem, identify and define the computing requirements, which may be appropriate to its solution.
- PO5:** Introduction to various courses like group theory, ring theory, field theory, metric spaces, number theory.
- PO6:** Enhancing students' overall development and to equip them with mathematical modeling abilities, problem solving skills, creative talent and power of communication necessary for various kinds of employment.
- PO7:** The skills of observations and drawing logical inferences from the scientific experiments.
- PO8:** Analyzed the given scientific data critically and systematically and the ability to draw the objective conclusions
- PO9:** Been able to think creatively to propose novel ideas in explaining facts and figures or providing new solutions to the problem
- PO10:** Realized how interdisciplinary approach helps in providing better solutions and new ideas for the sustainable developments

#### SPECIFIC PROGRAM OUTCOMES FOR B SC MATHEMATICS

- SPO1:** A student should be able to recall basic facts about mathematics and should be able to display knowledge of conventions such as notations, terminology.
- SPO2:** A student should get adequate exposure to global and local concerns that explore them many aspects of mathematical sciences.
- SPO3:** Student is equipped with mathematical modeling ability, problem solving skills, creative talent and power of communication necessary for various kinds of employment.
- SPO4:** Student should be able to apply their skills and knowledge that is translate information presented verbally into mathematical form, select and use appropriate mathematical formulae or techniques in order to process the information and draw the relevant conclusion.
- SPO5:** Enabling students to develop a positive attitude towards mathematics as an interesting and valuable subject of study.
- SPO6:** Think in a critical manner.
- SPO7:** Formulate and develop mathematical arguments in a logical manner.
- SPO8:** Acquire good knowledge and understanding in advanced areas of mathematics and statistics, chosen by the student from the given courses.
- SPO9:** Ability to acquire in-depth knowledge of algebra, calculus, geometry, differential equations and several other branches of mathematics. This also leads to study of related areas like computer science and physical science. Thus, this Program helps learners in building a solid foundation for higher studies in mathematics.
- SPO10:** The skills and knowledge gained has intrinsic beauty, which also leads to proficiency in analytical reasoning. This can be utilized in modeling and solving real life problems.
- SPO11:** To recognize patterns and to distinguish between essential and irrelevant aspects of problems. Utilize mathematics to solve theoretical and applied problems by critical

understanding, analysis and synthesis.

**SPO12:** Ability to share ideas and insights while seeking and benefitting from knowledge and insight of others. This helps them to learn behave responsibly in a rapidly changing interdependent society.

**SPO13:** Ability to communicate mathematics effectively by written, computational and graphic means.

**SPO14:** Create mathematical ideas from basic axioms.

**SPO15:** Ability to apply multivariable calculus tools in physics, economics, optimization, and understanding the architecture of curves and surfaces in plane and space etc.

**SPO16:** Able to present mathematics clearly and precisely, make vague ideas precise by formulating them in the language of mathematics, describe mathematical ideas from multiple perspectives and explain fundamental concepts of mathematics to non-mathematicians

**SPO17:** This Program will also help students to enhance their employability for jobs in banking, insurance and investment sectors, data analyst and in various other public and private enterprises.

## DEPARTMENT OF MATHEMATICS

### SEM-I DIFFERENTIAL CALCULUS ( PAPER I)

After the completion of the course, Students will be able to

- C01: Find Maxima and minima of function of two variables.
- C02: Explain sub tangent and subnormal.
- C03: Find angle of intersection of two curves.
- C04: Find circle, radius and centre of curvature .
- C05: Explain  $\sin n\theta$ ,  $\cos n\theta$  and  $\tan n\theta$  by using Demoiver's theorem
- C06: Expand  $\cos n\theta$ ,  $\sin n\theta$  and  $\tan n\theta$  in terms of  $\theta$
- C07: To able to calculate limits in indeterminate firms by a repeated use of L'Hospital rule.
- C08: To know the claim rule and use it to find derivatives of composite functions.
- C09: To able to evaluate integrals of rational functions by partial fractions

### SEM-II DIFFERENTIAL EQUATIONS (PAPER -II)

After the completion of the course, Students will be able to

- C01: Identify different types of differential equations and solve them
- C02: Extract the solution of differential equations of the first order and of the first degree by variables separable, Homogeneous and non – homogeneous methods.
- C03: Find a solution of differential equations of the first order and of a degree higher than the first by using methods of solvable for  $p$ ,  $x$  and  $y$
- C04: Compute all the solutions of second and higher order linear differential equations with constant coefficients linear equations with variable coefficients.
- C05: Solve simultaneous linear equations with constant coefficients and total differential equations.
- C06: Distinguish between linear, nonlinear, partial and ordinary differential equations.
- C07: Solve basic application problems described by second order linear differential equations.
- C08: Find the transforms of derivatives and integrals.

### SEM-III REAL ANALYSIS (PAPER - III)

After the completion of the course, Students will be able to

- C01: Describe the basic difference between the rational and real numbers.
- C02: Give the definition of concept related to metric spaces such as continuity, compactness, convergent etc.
- C03: Evaluate the limits of wide class of real sequences.
- C04: Understand and perform simple proofs.
- C05: Give the essence of the proof of Bolzano Waitress theorem the contraction theorem as well as existence of convergent subsequence using equicontinuity.
- C06: The course previous the basic for further studies with in function analysis, topology, function theory.
- C07: Students will be able to demonstrate basic knowledge of key topics in classical real analysis.

### SEM-III SEC II A THEORY OF EQUATIONS

After the completion of the course, Students will be able to

- C01: Describe the relation between roots and coefficients
- C02: Find the sum of the power of the roots of an equation using Newton's Method.
- C03: Transform the equation through roots multiplied by a given number, increase the roots, and decrease the roots, removal of terms.
- C04: Solve the reciprocal equations.

<p><b>C05:</b> Analyze the location and describe the nature of the roots of an equation</p> <p><b>C06:</b> Obtain integral roots of an equation by using Newton's Method.</p> <p><b>C07:</b> Compute a real root of an equation by Horner's method</p> <p><b>C08:</b> Illustrate the Division and Euclidean Algorithm</p> <p><b>C09:</b> Describe the properties of prime numbers</p> <p><b>C010:</b> Show that every positive integer can be expressed as product of prime power in unique way.</p> <p><b>C011:</b> Write a formula for the number of positive integers less than that are relatively prime to n.</p>
<b>SEM-III SEC-IIB LOGIC AND SETS</b>
<p>After the completion of the course, Students will be able to</p> <p><b>C01:</b> Properly use the vocabulary and symbolic notation of higher mathematics in definitions, theorems, and problems</p> <p><b>C02:</b> Analyze the logical structure of statements symbolically, including the proper use of logical connectives, predicates, and quantifiers.</p> <p><b>C03:</b> Construct truth tables, prove or disprove a hypothesis, and evaluate the truth of a statement using the principles of logic.</p> <p><b>C04:</b> Solve problems and write proofs using the concepts of set theory.</p> <p><b>C05:</b> Solve problems and write proofs using the basic definitions and the fundamental properties of subsets and operations on the real numbers, integers, rational and irrational, even and odd, multiples or factors of whole numbers.</p>
<b>SEM - IV ALGEBRA (PAPER - IV)</b>
<p>After the completion of the course, Students will be able to</p> <p><b>C01:</b> Recognize the mathematical object called groups</p> <p><b>C02:</b> Link fundamental concepts of groups' symmetries of geometrical objects.</p> <p><b>C03:</b> Explain the significance of notions of cosets, normal subgroups and factor groups.</p> <p><b>C04:</b> Analyze consequences of Lagrange's theorem.</p> <p><b>C05:</b> Learn about structure preserving maps between groups and their consequences.</p> <p><b>C06:</b> Understand the basic concepts of group actions and their applications.</p> <p><b>C07:</b> Know the fundamental concepts in ring theory such as the concept of ideals, quotient rings, integral domains and field.</p>
<b>SEM - IV SEC IV A Number Theory</b>
<p>After the completion of the course, Students will be able to</p> <p><b>C01:</b> Define the concept of divisibility.</p> <p><b>C02:</b> Define the concept of prime number.</p> <p><b>C03:</b> Explain division algorithm.</p> <p><b>C04:</b> Explain Euclid's algorithm.</p> <p><b>C05:</b> Explain the greatest common divisor.</p> <p><b>C06:</b> Explain the concept of congruence.</p> <p><b>C07:</b> Explain the concepts of linear congruence and quadratic linear congruence.</p> <p><b>C08:</b> Explain Fermat's Theorem, Euler's Theorem and Pie function.</p>
<b>SEM - IV SEC IV B Vector Calculus</b>
<p>After the completion of the course, Students will be able to</p> <p><b>C01:</b> Define vector equation for lines and planes</p>

<p><b>C02:</b> Analyze vector functions to find limits, derivatives, tangent lines, integrals, arc length, curvature, torsion</p> <p><b>C03:</b> Compute limits and derivatives of functions of two and three variables</p> <p><b>C04:</b> Differentiate vector fields</p> <p><b>C05:</b> Determine gradient vector fields and find potential functions</p> <p><b>C06:</b> Evaluate line integrals, surface area and surface integrals</p> <p><b>C07:</b> Vector calculus motivates the study of vector differentiation and integration in two and three dimensional spaces.</p>
<p style="text-align: center;"><b>SEM -V      PAPER –V A   LINEAR ALGEBRA</b></p>
<p>After the completion of the course, Students will be able to</p> <p><b>C01:</b> Linear algebra emphasizes the concept of vector spaces and linear transformations which are essential in simplifying various scientific problems .</p> <p><b>C02:</b>It aims at inculcating problem solving skills with in student to enable them compute large linear systems</p> <p><b>C03:</b>The practical applications of linear algebra are in demography , archaeology , electrical engineering traffic analysis</p> <p><b>C04:</b>Express vector spaces in different dimensions</p> <p><b>C05:</b>Explain two vectors are orthogonal</p> <p><b>C06:</b>Express that a set is orthogonal and orthonormal</p> <p><b>C07:</b>Express the row and column space of a matrix</p> <p><b>C08:</b>Explain eigen values and eigen vectors of a linear transformation</p> <p><b>C09:</b>Explain when a transformation matrix can we written in the form of a diagonal matrix</p>
<p style="text-align: center;"><b>SEM-V      PAPER- V B   COMPLEX ANALYSIS</b></p>
<p>After the completion of the course, Students will be able to</p> <p><b>CO1:</b> Define the concepts of derivation of analytic functions.</p> <p><b>CO2:</b> Calculate the analytic functions.</p> <p><b>CO3:</b> Express the Cauchy’s Derivative formulas.</p> <p><b>CO4:</b>Define the concept of Cauchy-Goursat Integral Theorem</p> <p><b>CO5:</b>Evaluate complex integrals by using Cauchy-Goursat Integral Theorem</p> <p><b>CO6:</b> Define the simple and multiple connected domains.</p> <p><b>CO7:</b> Express Liouville’s theorem and the fundamental theorem of the algebra.</p> <p><b>CO8:</b> Explain fundamental theorem algebra and maximum modules principle.</p>
<p style="text-align: center;"><b>SEM-VI      NUMERICAL ANALYSIS   PAPER – VIA</b></p>
<p>After the completion of the course, Students will be able to</p> <p><b>C01:</b> Learn various numerical methods to solve algebraic and transcendental equations</p> <p><b>C02:</b> Understand forward ,backward and central differences and relationships between them</p> <p><b>C03:</b>Learns divided difference its properties and use Newton’s formula to for interpolation .</p> <p><b>C04:</b> Learn numerical differentiation and able to use various numerical methods to find differentiation</p> <p><b>C05:</b> Approximate a function using and appropriate numerical method .</p> <p><b>C06:</b> Solve a linear system of equation using and appropriate numerical method .</p> <p><b>C07:</b> Prove results for numerical route finding methods .</p> <p><b>C08:</b> Calculate a definite integral using and appropriate numerical method .</p>
<p style="text-align: center;"><b>SEM -VI      PAPER –VI B      SOLID GEOMETRY</b></p>



After the completion of the course, Students will be able to

**C01:** Find centre and radius of sphere and circles

**C02:** Find family of spheres passing through a circle, tangent planes and normal lines to sphere

**C03:** Identify different conchoids and sketch them

**C04:** Understand relationship between different co-ordinate system and plot the curve in spherical, cylindrical polar co-ordinates

**C05:** Obtain equation of cone, enveloping cone, cylinder, right circular cylinder, enveloping cylinder and prove their results

**C06:** Find equation of tangent plane, reciprocal cone of given cone

**C07:** Understand the beautiful interplay between algebra and geometry

### **SEM -VI PAPER -VI C INTEGRAL CALCULUS**

After the completion of the course, Students will be able to

**C01:** Evaluate the area of surfaces of revolution.

**C02:** Determine the area of and volume by applying the techniques of double and triple integrals

**C03:** Identify different types differential equations and solve them.

**C04:** Define volumes of solid of revolution.

**C05:** Explain change of order of integration.

**C06:** Evaluate change of the variable in a multiple inferable.

**C07:** Solve different types of triple integral sums.

**DEPARTMENT OF PHYSICS**  
**B.Sc. PHYSICS**

<b>PROGRAMME OUTCOMES</b>
<p>After the completion of the Programme, Students will be able to</p> <p><b>PO1:</b> Apply the Basic principles of Physics to the events occurring around us and also in the world.</p> <p><b>PO2:</b> Try to find out or analyze scientific reasoning for various things.</p> <p><b>PO3:</b> Develop ability to work in group.</p> <p><b>PO4:</b> Develop capacity of critical reasoning, judgment and communication skills.</p> <p><b>PO5:</b> Develop abilities for logical thinking.</p> <p><b>PO6:</b> Apply the knowledge to develop the sustainable and eco friendly technology for pollution free environment.</p> <p><b>PO7:</b> Collaborate effectively on team oriented projects in the field of Physics.</p> <p><b>PO8:</b> Communicate scientific information in a clear and concise manner both orally and in writing or through audio and video presentations.</p> <p><b>PO9:</b> Become empowered to face the challenges of the changing universe.</p> <p><b>PO10:</b> Be initiated into the basics of research.</p>

<b>SPECIFIC PROGRAMME OUTCOMES</b>
<p>This undergraduate course in Physics Would provide the opportunity to the students:</p> <p><b>SPO1:</b> To understand the basic laws and explore the fundamental concepts of physics</p> <p><b>SPO2:</b> To understand the concepts and significance of the various physical phenomena.</p> <p><b>SPO3:</b> To carry out experiments to understand the laws and concepts of Physics.</p> <p><b>SPO4:</b> To apply the theories learnt and the skills acquired to solve real time problems.</p> <p><b>SPO5:</b> To acquire a wide range of problem solving skills, both analytical and technical and to apply them.</p> <p><b>SPO6:</b> To enhance the student's academic abilities, personal qualities and transferable skills this will give them an opportunity to develop as responsible citizens.</p> <p><b>SPO7:</b> To produce graduates who excel in the competencies and values required for leadership to serve a rapidly evolving global community.</p> <p><b>SPO8:</b> To motivate the students to pursue PG courses in reputed institutions.</p> <p><b>SPO9:</b> This course introduces students to the methods of experimental physics. Emphasis will be given on laboratory techniques specially the importance of accuracy of measurements.</p> <p><b>SPO10:</b> Providing a hands-on learning experience such as in measuring the basic concepts in properties of matter, heat, optics, electricity and electronics.</p>

## DEPARTMENT OF PHYSICS

### SEM-I MECHANICS (PAPER I)

After the completion of the course, Students will be able to

**CO1:** The students would learn about the behaviour of physical bodies it provides the basic concepts related to the motion of all the objects around us in our daily life.

**CO2:** The course builds a foundation of various applied field in science and technology; especially in the field of mechanical engineering.

**CO3:** The course comprises of the study vectors, laws of motion, momentum, energy, rotational motion, gravitation, fluids, elasticity and special relativity.

### SEM-II THERMAL PHYSICS (PAPER II)

After the completion of the course, Students will be able to

**CO1:** The course makes the students able to understand the basic physics of heat and temperature and their relation with energy, work, radiation and matter.

**CO2:** The students also learn how laws of thermodynamics are used in a heat engine to transform heat into work.

**CO3:** The course contains the study of laws of thermodynamics, thermodynamic description of systems, thermodynamic potentials, kinetic theory of gases, theory of radiation and statistical mechanics.

### SEM-III ELECTROMAGNETISM (PAPER III)

After the completion of the course, Students will be able to

**CO1:** It gives an opportunity for the students to learn about one of the fundamental interactions of electricity and magnetism, both as separate phenomena and as a singular electromagnetic force.

**CO2:** The course contains vector analysis, electrostatics, magnetism, electromagnetic induction and Maxwell's equations.

**CO3:** The course is very useful for the students in almost every branch of science and engineering.

### SEM-IV WAVES AND OPTICS (PAPER IV)

After the completion of the course, Students will be able to

**CO1:** The course comprises of the study of superposition of harmonic oscillations, waves motion (general), oscillators, sound, wave optics, interference, diffraction, polarization.

**CO2:** The course is important for the students to make their career in various branches of science and engineering, especially in the field of photonic engineering.

### SEM-V MODERN PHYSICS (PAPER-V)

After the completion of the course, Students will be able to

**CO1:** Students would know about the basic principles in the development of modern physics.

**CO2:** The topics covered in the course build a basic foundation of undergraduate physics students to study the advance branches: quantum physics, nuclear physics, particle physics and high energy physics.

**CO3:** The course contains the study of Planck's hypothesis, photoelectric effect, Compton effect, matter waves, atomic models, Schrodinger wave equations, and brief idea of nuclear physics.

### SEM-VI BASIC ELECTRONICS (PAPER VI)

After the completion of the course, Students will be able to

**CO1:** The students would gain the knowledge of Basic Electronics circuits, network theorems and measuring instruments.

**CO2:** They would know about common solid state devices: Semiconductor diodes and transistors.

**CO3:** The topics also include the Rectifiers, Filters and their applications, number systems and logic gates which are foundation blocks of digital electronics.

**CO4:** Students would learn about electronic circuits such as Amplifiers and Oscillators.

**CO5:** Various types of Amplifier and Oscillator circuits their working and applications in in domestic, industrial and scientific devices/equipments.

# Program Outcomes

## Program Outcome of Bachelor of Arts (B.A.)

Student seeking admission for B.A. programme is expected to imbue with following quality which helps them in their future life to achieve the expected Goals.

- a. Realization of human values.
- b. Sense of social service.
- c. Responsible and dutiful citizen.
- d. Critical temper
- e. Creative ability.

## Program Specific Outcomes B.A. (Political Science)

On completion of B.A (Political Science), Students are able to:

1. To understand the basic concept and subject of Political Science & its origin
2. To make or not the importance of subject Political Science & its Branches.
3. To understand various aspect of Political Science with a process to reach method and giving new mode and direction.
4. To make a attempt in different area and theory.
5. To know about Political Science its roots cause perspectives and methods.
6. Elaborating and understanding its philosophical methods of Political Science.
7. Evaluating the concept of Political Science from past to present and making the society more closely through.

## Course outcomes

**Class: - (Sem. I)**

**Paper Name:-Understanding Political Theory (Paper I)**

On completion of the course, students are able to

1. To able to understand Political Theory nature and Significance.
2. To able to understand the Power and Authority.
3. To able to understand Liberty, Equality and Justice.
4. To able to understand Political Ideologies.
5. Legislature, Executive and Judiciary

**Class: - (Sem. II)**

**Paper Name:- Western Political Thought (Paper II)**

On completion of the course, students are able to

1. To able to understand Greek Political Thought.
2. To able to understand Medieval and Early Modern Thought.
3. To able to understand Utilitarian Thought.
4. To able to understand Philosophy of Dialectics.
5. To able to understand Habbes, Lockce, Reousseau Theory.

**Class: - (Sem. III)**

**Paper Name:-Indain Political Thought (Paper III)**

On completion of the course, students are able to

1. To able to Understand Manu, Bhudha and Kautilya thought.
2. To able to understand Medieval Political Thought- Basava and Barani.
3. To able to understand Rajaram Mohan Roy-Brahma Samaj, Swami Dayanand Saraswati.
4. To able to understand Arya Samaj and Social reform works.
5. To able to understand Socialist thought Jay Prakash Narayan, Jawaharlal Neharu.
6. To able to understand Satya grah and Trustiship.

**Class: - (Sem. IV)**

**Paper Name:-Constitution and Politics of India (Paper-IV)**

On completion of the course, students are able to

1. To able to understand Contitutional Development in India.
2. To able to understand Union and state Government.
3. To able to understand Union state Relations.
4. To able to understand Electoral Politics in India.
5. To able to understand Issues in Indian Politices.

**Class: - (Sem. V)**

**Paper Name:-International Relations (Paper-V)**

On completion of the course, students are able to

1. To able to understand International Relations-Nature and Scope.
2. To able to understand Nazism and Facism.
3. To able to understand Cold war.
4. To able to understand Indian's Foreign Policy.
5. To able to understand India Relations with other countries .

**Class: - (Sem. VI)**

**Paper Name:-Global Politics (Paper-VI)**

On completion of the course, students are able to

1. To able to understand Power and his Elements .
2. To able to understand UNO.
3. To able to understand Human Rights.
4. To able to understand Arms Race and Arms Control .
5. To able to understand Contemporary Political Theory.

**HOD**

**Department of Political Science**

## B.Sc. Statistics – Program outcomes

PO1	Acquire the ability to bring together and flexibly apply knowledge to characterize, analyze and solve a wide range of problems
PO2	Recognize and appreciate the connections between theory and applications
PO3	Analyzed the given scientific data critically and systematically and the ability to draw the objective conclusions.
PO4	Have the versatility to work effectively in a broad range of analytic, scientific, government, financial, health, technical and other positions
PO5	Choose appropriate statistical methods and demonstrate their ability to apply various concepts in exploratory data analysis
PO6	To carry out data analysis using different statistical software like Microsoft excel, R etc...
PO7	Demonstrate the ability to manipulate and visualize data and to compute standard statistical summaries.

## B.Sc. Statistics - Program specific outcomes

PSO1	A student should be able to recall basic facts about statistics and should be able to display knowledge of conventions such as notations, terminology.
PSO2	A student should get adequate exposure to global and local concerns that explore them many aspects of mathematical sciences.
PSO3	Student is equipped with statistical modeling ability, problem solving skills, creative talent and power of communication necessary for various kinds of employment.
PSO4	Student should be able to apply their skills and knowledge that is translate information presented verbally into statistical form, select and use appropriate statistical formulae or techniques in order to process the information and draw the relevant conclusion.
PSO5	Enabling students to develop a positive attitude towards statistics as an interesting and valuable subject of study.

## B.Sc. Statistics - Course Outcomes

Paper	Course Outcomes
Descriptive Statistics and Probability	Learning basic statistical tools, types of qualitative and quantitative data, and diagrammatic and graphical representations and Organize, manage and present data.
Probability Distributions	Identify the type of statistical situation to which different distributions can be applied. Use different distributions to solve simple practical problems. Ability to distinguish between random and non-random experiments. Discrete distributions expose the real-life applications. Use the Normal probability distribution including standard normal curve

	calculations of appropriate areas. Practice and solve the various distributions to simple practical problems. Expose the real-life applications of continuous distribution.
Statistical Methods and Theory of Estimation	List the ideal properties of point estimators of an unknown parameter of a distribution and select the best estimators using different properties. Determine estimators of unknown parameters using methods like MLE, Method of moments etc..
Statistical Inference	Understand the process of hypothesis testing and its significance. Distinguish various test used in sampling theory. Use the different test in solving statistical problems. Gain knowledge in sampling distribution theory and their applications in statistical inference. Chi- square, t and F distribution, Chebyshev's inequality, Weak Law of Large numbers and the Central Limit Theorem.
Sampling Techniques, Time Series, Index Numbers and Demand Analysis	Students will acquire the basic knowledge of complete enumeration and sample, sampling frame, sampling distribution, sampling and non-sampling errors, principal steps in sample surveys, limitations of sampling etc., an idea of conducting the sample surveys and selecting appropriate sampling techniques. Introduced to various statistical sampling schemes such as simple, stratified and systematic sampling. Index number application various field, Fitting of trend by Moving Average method. Applications to real data by means of laboratory assignments. Time series data, its applications to various fields and components of time series,
Statistical Quality Control and Reliability	Although descriptions of specific characteristics are helpful, they are not enough to identify whether there is a problem with quality. The tools in each of these categories provide different types of information for use in quality analysis. Acceptance sampling can help to solve this problem.
Design of Experiments, Vital Statistics, Official Statistics and Business Forecasting	Understand the basic terms used in design of experiments. Use appropriate experimental designs to analyze the experimental data. Carry out one way and two way Analysis of Variance. The vital events based on the population studies, understanding birth, death process and life table combining demography data. Learning about the theory of stable population, population projection and about the concept of migration theory. The course aims to study various features of the demography. It also gives the study of distribution of population with respect to birth, migration, aging and death. The students will also be able to work for the planning and execution of the government plans and for the others sectors as well.
Operation Research	Describe Simplex method to solve the linear programming problem. Explain the steps in solving a linear programming problem by two phase method. Explain the concept of duality in linear programming problem. Give the outline of dual simplex method. Describe the computational procedure of optimality test in a transportation table. Explain the Hungarian method to solve the Assignment problem.



# **Programme Outcomes, Programme Specific Outcomes and Course Outcomes For PG Programmes**

**Programme Name: M. A. in Hindi**

***Number of Semesters: Four***

Hindi Mahavidyalaya  
Department of Hindi

## **Programme Outcomes**

- To prepare the students with skills to analyze the concept and different theories of Hindi literature and language.
- To prepare the students for pursuing research or careers in Hindi language and literature and it's allied fields.
- Imbibe the effective communication in both mediums of expression (oral and writing).
- Continue to acquire relevant knowledge and skills appropriate to professional activities.
- Create awareness to become an enlightened citizen with commitment to deliver one's responsibilities within the scope of bestowed rights and privileges.

## **Programme Specific Outcomes**

- To prepare and motivate students for research studies in Hindi language and literature and related fields.
- To provide advanced knowledge of different theories of Hindi language and literature and empowering the students to pursue higher degrees/research at reputed academic institutions.
- To nurture analytical qualities or skills, thinking power, creativity through assignments & project works.
- To assist students in preparing (personal guidance, books) for competitive exams. e.g. NET/SET, Staff Selection Commission, Banking sector/Govt. of India undertakings (Rajbhasha Sahayak or Hindi Officer/ Hindi Translator), School Service Commission etc.
- To encourage the students for original thinking/thought /decision making.
- To imbibe the effective communication in both mediums of expression (oral and writing).

## Course Outcomes

SEMESTER—I		
Course Code	Course Name	Course Outcomes
101	Aadikaal, Madhyakaal Evam Reetikaal	<p><b><u>Knowledge gained:</u></b></p> <ul style="list-style-type: none"> <li>• Concept of History of Hindi Literature of beginning period (Aadikaal) and medieval period (Madhyakaal)</li> </ul> <p><b><u>Skill gained:</u></b></p> <ul style="list-style-type: none"> <li>• Ability to understand the development of Hindi language and literature of Aadikal &amp; Madhyakaal.</li> </ul> <p><b><u>Competency developed:</u></b></p> <ul style="list-style-type: none"> <li>• Understanding of History of Hindi literature and language of Aadikaal and Madhyakaal.</li> <li>• Differentiation and departure points of Hindi literature and language of Aadikaal and Madhyakaal.</li> <li>• Time framing ability of Aadikaleen and Madhyakaleen Hindi Literature.</li> </ul>
102	Hindi ka Prachin Evam Madhyakaleen Kavya	<p><b><u>Knowledge gained:</u></b></p> <ul style="list-style-type: none"> <li>• Concept of text based Prachin &amp; Madhyakaleen Hindi Literature.</li> </ul> <p><b><u>Skill gained:</u></b></p> <ul style="list-style-type: none"> <li>• Ability to understand the development of Prachin &amp; Madhyakaleen Hindi Literature</li> </ul> <p><b><u>Competency developed:</u></b></p> <ul style="list-style-type: none"> <li>• Understanding of Hindi literature and language of Aadikaal and Madhyakaal.</li> <li>• Differentiation and departure points of Hindi literature and language of Aadikaal and Madhyakaal.</li> <li>• Ability to think about Hindi literature and language of Aadikaal and Madhyakaal.</li> </ul>
103	Hindi Gadya Sahitya	<p><b><u>Knowledge gained:</u></b></p> <ul style="list-style-type: none"> <li>• General Study of Nibandh Sahitya by Archarya Ramchandra Shukla, BalaKrishna Bhatt and hazariprasad Dwivedi.</li> </ul> <p><b><u>Skill gained:</u></b></p> <ul style="list-style-type: none"> <li>• General Study of Story Literature.</li> </ul> <p><b><u>Competency developed:</u></b></p> <ul style="list-style-type: none"> <li>• Understanding novels literature and Different types of Prose.</li> </ul>
104	Bharatiya Sahitya	<p><b><u>Knowledge gained:</u></b></p> <ul style="list-style-type: none"> <li>• Concept of Bharatiya Sahitya.</li> </ul> <p><b><u>Skill gained:</u></b></p> <ul style="list-style-type: none"> <li>• Ability to understand the development of Indian literature by different theories &amp; textual study.</li> </ul> <p><b><u>Competency developed:</u></b></p> <ul style="list-style-type: none"> <li>• Understanding of development of Indian literature &amp; comparative literature.</li> <li>• Differentiation and departure points of Indian literature.</li> <li>• Ability to think about Indian literature &amp; translation.</li> </ul>

SEMESTER—II		
Course Code	Course Name	Course Outcomes
201	Aadhunik Hindi Kavya	<p><b><u>Knowledge gained:</u></b></p> <ul style="list-style-type: none"> <li>• Concept of Modern Hindi Poetry (Aadhunik Hindi Kavya).</li> </ul> <p><b><u>Skill gained:</u></b></p> <ul style="list-style-type: none"> <li>• Ability to understand the development of Modern Hindi Poetry (Aadhunik Hindi Kavya) by textual study.</li> </ul> <p><b><u>Competency developed:</u></b></p> <ul style="list-style-type: none"> <li>• Understanding of development of Modern Hindi Poetry.</li> <li>• Differentiation and departure points of Modern Hindi Poetry.</li> <li>• Ability to think about Modern Hindi Poetry (Aadhunik Hindi Kavya).</li> </ul>
202	Aadhunik Hindi Gadya Sahitya	<p><b><u>Knowledge gained:</u></b></p> <ul style="list-style-type: none"> <li>• Concept of Hindi 'Gadya Ki Vividh Vidhaen.'</li> </ul> <p><b><u>Skill gained:</u></b></p> <ul style="list-style-type: none"> <li>• Ability to understand the development of Hindi 'Gadya Ki Vividh Vidhaen.'</li> </ul> <p><b><u>Competency developed:</u></b></p> <ul style="list-style-type: none"> <li>• Understanding of Hindi 'Gadya Ki Vividh Vidhaen.'</li> <li>• Differentiation and departure points of Hindi 'Gadya Ki Vividh Vidhaen.'</li> </ul>
203	Hindi Sahitya ka Itihas (Aadhunik kaal)	<p><b><u>Knowledge gained:</u></b></p> <p>Concept of History of Hindi Literature of Aadhunik kaal.</p> <p><b><u>Skill gained:</u></b></p> <ul style="list-style-type: none"> <li>• Ability to understand the development of Hindi language and literature of Aadhunik kaal.</li> </ul> <p><b><u>Competency developed:</u></b></p> <ul style="list-style-type: none"> <li>• Understanding of History of Hindi literature and language of Aadhunik kaal.</li> <li>• Differentiation and departure points of Hindi literature and language of Aadhunik kaal.</li> <li>• Time framing ability of Aadhunik kaal Hindi Literature.</li> </ul>
204	Hindi ke Vividh Anuprayog	<p><b><u>Knowledge gained:</u></b></p> <ul style="list-style-type: none"> <li>• Prayojanmulak Hindi Vividh Kshetra.</li> </ul> <p><b><u>Skill gained:</u></b></p> <ul style="list-style-type: none"> <li>• Ability to Understand different types of Official letters .</li> </ul> <p><b><u>Competency developed:</u></b></p> <ul style="list-style-type: none"> <li>• Understanding History of Journalism .</li> <li>• Importance of Advertisement and Importance of Language in News pape .</li> </ul>
205	Tulanatmak Sahitya	<p><b><u>Knowledge gained:</u></b></p> <p>Concept of Comparative Literature.</p> <p><b><u>Skill gained:</u></b></p> <p>Ability to understand Tulanatmak Sahitya ke Kshetra.</p> <p><b><u>Competency developed:</u></b></p> <ul style="list-style-type: none"> <li>• Ability to Understand Tulanatmak Sahitya ke Adhyayan ki Pravidhiyan</li> <li>• Ability to Understand Tulugu Sahitya ka Itihas.</li> </ul>

SEMESTER—III		
Course Code	Course Name	Course Outcomes
301	Poorva Madhya Kaleen Kavya	<p><b><u>Knowledge gained:</u></b></p> <ul style="list-style-type: none"> <li>• Concept of text based Prachin &amp; Madhyakaleen Hindi Literature.</li> </ul> <p><b><u>Skill gained:</u></b></p> <ul style="list-style-type: none"> <li>• Ability to understand the development of Prachin &amp; Madhyakaleen Hindi Literature</li> </ul> <p><b><u>Competency developed:</u></b></p> <ul style="list-style-type: none"> <li>• Understanding of Hindi literature and language of Aadikaal and Madhyakaal.</li> <li>• Differentiation and departure points of Hindi literature and language of Aadikaal and Madhyakaal.</li> <li>• Ability to think about Hindi literature and language of Aadikaal and Madhyakaal.</li> </ul>
302	Bhasha Vigyan ke Samanya Siddhant	<p><b><u>Knowledge gained:</u></b></p> <ul style="list-style-type: none"> <li>• Concept of Hindi language &amp; Linguistics.</li> </ul> <p><b><u>Skill gained:</u></b></p> <ul style="list-style-type: none"> <li>• Ability to understand the development of Hindi language &amp; Linguistics.</li> </ul> <p><b><u>Competency developed:</u></b></p> <ul style="list-style-type: none"> <li>• Understanding of Hindi language &amp; Linguistics.</li> <li>• Differentiation and departure points of Hindi language &amp; Linguistics.</li> <li>• Ability to think about Hindi language &amp; Linguistics.</li> </ul>
303	Bharatiya Kavya Shastra	<p><b><u>Knowledge gained:</u></b></p> <ul style="list-style-type: none"> <li>• Concept of Bharatiya Kavya Shastra.</li> </ul> <p><b><u>Skill gained:</u></b></p> <ul style="list-style-type: none"> <li>• Ability to understand the Bharatiya Kavya Shastra ki Rooprekha.</li> </ul> <p><b><u>Competency developed:</u></b></p> <ul style="list-style-type: none"> <li>• Understanding of Ras and Alankar Siddhant.</li> <li>• Understanding of Reeti and Vakrokti Siddhant.</li> </ul>
304	Chhayavad-I	<p><b><u>Knowledge gained:</u></b></p> <ul style="list-style-type: none"> <li>• General study of chaayavaad.</li> </ul> <p><b><u>Skill gained:</u></b></p> <p>General study of poet jayashankar Prasad and his special refrence to 'lahar' and 'aansu'</p> <p><b><u>Competency developed:</u></b></p> <ul style="list-style-type: none"> <li>• General study of poet suryakant tripathi niral and special reference to ram ki shakti pooja.</li> <li>• General studies of books with critical analysis kamayani and tulsidas niral.</li> </ul>
305	Janasanchaar ke madhyam aur hindi	<p><b><u>Knowledge gained:</u></b></p> <ul style="list-style-type: none"> <li>• Study of Jansanchar ke madhyam.</li> <li>• Study of Patrakarita and Vigyapan</li> </ul> <p><b><u>Skill gained:</u></b></p> <ul style="list-style-type: none"> <li>• Ablity to Understand Journalism.</li> </ul> <p><b><u>Competency developed:</u></b></p> <ul style="list-style-type: none"> <li>• General Study of TV ke Hindi karyaakram.</li> <li>• General studies of Sanchar Madhyamon ke roop me Bharat mein Prasarit Radio tatha TV ke Hindi Karyaakram.</li> </ul>

SEMESTER—IV		
Course Code	Course Name	Course Outcomes
401	Uttar Madhya Kaaleen Kavya	<p><b><u>Knowledge gained:</u></b></p> <ul style="list-style-type: none"> <li>• Study of Bihari Navneet, Ghananand and Raskhaan.'</li> </ul> <p><b><u>Skill gained:</u></b></p> <ul style="list-style-type: none"> <li>• Detailed Study with Critical Analysis of Bihari.</li> </ul> <p><b><u>Competency developed:</u></b></p> <ul style="list-style-type: none"> <li>• Detailed Study with critical analysis of Raskhaan</li> <li>• Non-detailed Study with critical analysis of meerabai and her poetry.'</li> </ul>
402	Hindi Bhasha ka Itihas	<p><b><u>Knowledge gained:</u></b></p> <ul style="list-style-type: none"> <li>• Concept of Hindi language &amp; Linguistics.</li> </ul> <p><b><u>Skill gained:</u></b></p> <ul style="list-style-type: none"> <li>• Ability to understand the development of Hindi language &amp; Linguistics.</li> <li>• Ability to understand Hindi Bhasha Kshetra, Hindi me Videshi Dhvaniyan, Sarvanamon ka vikaskram.</li> </ul> <p><b><u>Competency developed:</u></b></p> <ul style="list-style-type: none"> <li>• Understanding of Hindi language &amp; Linguistics.</li> <li>• Differentiation and departure points of Hindi language &amp; Linguistics.</li> <li>• Ability to think about Hindi language &amp; Linguistics.</li> </ul>
403	Pashchatya Kavya Shastra Evam Hindi Alochanā	<p><b><u>Knowledge gained:</u></b></p> <ul style="list-style-type: none"> <li>• Concept of Indian &amp; Western poetics</li> </ul> <p><b><u>Skill gained:</u></b></p> <ul style="list-style-type: none"> <li>• Ability to understand the development of Indian &amp; Western poetics.</li> </ul> <p><b><u>Competency developed:</u></b></p> <ul style="list-style-type: none"> <li>• Understanding of the development of Indian &amp; Western poetics.</li> <li>• Differentiation and departure points of Indian &amp; Western poetics.</li> <li>• Ability to think about the development of Indian &amp; Western poetics.</li> </ul>
404	Chayavad-II	<p><b><u>Knowledge gained:</u></b></p> <ul style="list-style-type: none"> <li>• General Study of Poet Sumitranandan Pant and his works with special reference to 'Granthi' and Pallav'.</li> </ul> <p><b><u>Skill gained:</u></b></p> <ul style="list-style-type: none"> <li>• General Study of poetess Mahadevi Verma with Special reference to 'Sandhyageet and Deepshikha'.</li> </ul> <p><b><u>Competency developed:</u></b></p> <ul style="list-style-type: none"> <li>• General Study of Poet Rameshwar Shukla Anchal and his works.</li> <li>• General Study of poet Bhagawathi Charan Verma and his works.</li> </ul>
405	Hindi Patrakarita	<p><b><u>Knowledge gained:</u></b></p> <ul style="list-style-type: none"> <li>• General Study of Patrakarita.</li> </ul> <p><b><u>Skill gained:</u></b></p> <ul style="list-style-type: none"> <li>• Study of Patrakarita ke vikas ke vividh Charan.</li> </ul> <p><b><u>Competency developed:</u></b></p> <ul style="list-style-type: none"> <li>• Study of Samachar sampadan.</li> <li>• Study of Samachar ke Prakar.</li> </ul>

**Programme Name: MSc Mathematics**

**Programme Outcomes**

- PO1:** Inculcate critical thinking to carry out scientific investigation objectively without being biased with preconceived notions.
- PO2:** Equip the student with skills to analyze problems, formulate an hypothesis, evaluate and validate results, and draw reasonable conclusions thereof.
- PO3:** Prepare students for pursuing research or careers in industry in mathematical sciences and allied fields
- PO4:** Imbibe effective scientific and/or technical communication in both oral and writing.
- PO5:** Continue to acquire relevant knowledge and skills appropriate to professional activities and demonstrate highest standards of ethical issues in mathematical sciences.
- PO6:** Create awareness to become an enlightened citizen with commitment to deliver one's responsibilities within the scope of bestowed rights and privileges.

**Programme Specific Outcomes**

- SPO1:** Understanding of the fundamental axioms in mathematics and capability of developing ideas based on them.
- SPO2:** Inculcate mathematical reasoning.
- SPO3:** Provide knowledge of a wide range of mathematical techniques and application of mathematical methods/tools in other scientific and engineering domains.
- SPO4:** Provide advanced knowledge on topics in pure mathematics, empowering the students to pursue higher degrees at reputed academic institutions.
- SPO5:** Strong foundation on algebraic topology and representation theory which have strong links and application in theoretical physics, in particular string theory.
- SPO6:** Good understanding of number theory which can be used in modern online cryptographic technologies.
- SPO7:** Nurture problem solving skills, thinking, creativity through assignments, project work.
- SPO8:** Assist students in preparing (personal guidance, books) for competitive exams e.g. NET, GATE, etc.
- SPO9:** Prepare and motivate students for research studies in mathematics and related fields.

## SEM I

### PAPER – I Abstract Algebra

After the completion of the course, Students will be able to

- CO1:** Define the external direct product and be able to compute the direct product of groups.
- CO2:** Define normal subgroups and be able to prove that given subgroups are normal.
- CO3:** Concept of group action and theorems about group actions.
- CO4:** Structure of permutation groups.
- CO5:** Polynomial rings, EDs, PIDs, & UFDs, and relations among them. Universality of Polynomial rings
- CO6:** Solving problems using the powerful concept of group action.
- CO7:** Facility in understanding the structure of a problem where the problem involves a permutation group
- CO8:** Ability to understand a large class of commutative rings by regarding them as quotients of polynomial rings by suitable ideals.
- CO9:** Apply Lagrange's theorem.

### Paper – II Mathematical Analysis

After the completion of the course, Students will be able to

- CO1:** Describe fundamental properties of the real numbers that lead to the formal development of mathematical analysis.
- CO2:** Comprehend regions arguments developing the theory underpinning mathematical analysis.
- CO3:** Demonstrate an understanding of limits and how that is used in sequences, series and differentiation.
- CO4:** Construct rigorous mathematical proofs of basic results in mathematical analysis.
- CO5:** Appreciate how abstract ideas and rigorous methods in mathematical analysis can be applied to important practical problems.

### Paper – III Ordinary & Partial Differential Equation

After the completion of the course, Students will be able to

- CO1:** Classify partial differential equations and transform into canonical form.
- CO2:** Solve linear partial differential equations of both first and second order
- CO3:** Apply partial derivative equation techniques to predict the behavior of certain phenomena.
- CO4:** Apply specific methodologies, techniques and resources to conduct research and produce innovative results in the area of specialization.
- CO5:** Extract information from partial derivative models in order to interpret reality.
- CO6:** Identify real phenomena as models of partial derivative equations. Demonstrate familiarity with emerging mathematical techniques appropriate in banks and other financial institutions.
- CO7:** Demonstrate an ability to select and apply numerical methods appropriate for the solution of financial problems.
- CO7:** The principles of mathematical reasoning and their use in understanding analyzing and developing formal arguments.
- CO8:** The connect lens between the mathematical series and other scientific and humoristic disciplines.

### Paper – IV Elementary Number Theory

After the completion of the course, Students will be able to

- CO1:** Prove results involving divisibility and greatest common divisors. Solve systems of linear congruence's.
- CO2:** Find integral solutions to specified linear Diophantine Equations.
- CO3:** Apply Euler-Fermat's Theorem to prove relations involving prime numbers.
- CO4:** Apply the Wilson's theorem.
- CO5:** Demonstrate knowledge and understanding of topics including, but not limited to divisibility, prime numbers, congruences, quadratic reciprocity, Diophantine equations. □
- CO6:** Learn methods and techniques used in number theory. □
- CO7:** Write programs/functions to compute number theoretic functions. □
- CO8:** Use mathematical induction and other types of proof writing techniques.



### **Paper – V Discrete Mathematics**

After the completion of the course, Students will be able to

**CO1:** Understand the basic principles of sets and operations in sets.

**CO2:** Apply counting principles to determine probabilities Demonstrate different traversal methods for trees and graphs.

**CO3:** Write model problems in computer science using tree and graphs.

**CO4:** Write an argument using logical notation and determine if the argument is or is not valid.

**CO5:** Determine when a function is one-one and onto.

**CO6:** Demonstrate the ability to write and evaluate a proof.

## SEM II

### PAPER – I Galois's Theory

After the completion of the course, Students will be able to

- C01: Explain the fundamental concepts of Galois Theory and their role in modern mathematics applied contexts.
- C02: Explain Demonstrate accurate and efficient use of advanced algebraic techniques.
- C03: Demonstrate capacity for mathematical reasoning through analyzing, proving and concepts from advanced algebra.
- C04: Apply problem solving using Galois Theory techniques applied to diverse situations in physics, engineering and other mathematical finance.

### Paper – II Lebesgue Measure and Integrations

After the completion of the course, Students will be able to

- CO1: Read analyze and write logical arguments to prove mathematical concepts.
- CO2: Communicate mathematical ideas with clarity and coherence both written and verbally.
- CO3: Fundamental objects, techniques and theorems in the mathematical sciences including the fields of analysis.
- CO4: Master the object material in the four required core course that forms the academic pillars of the program.
- CO5: Demonstrate a competence in formulating, analyzing and solving problems in several core areas of mathematics at a detailed level, including analysis.

### Paper – III Complex Analysis

After the completion of the course, Students will be able to

- C01: Students will be able to understand the concept of limit for real functions and be able to
- C02: calculate limits of standard functions and construct simple proofs involving this concept;
- C03: Student will be introduced to the concept of continuity and be familiar with the statements and proofs of the standard results about continuous real functions;
- C04: Student will understand the concept of the differentiability of a real valued function and be
- C05: familiar with the statements and proofs of the standard results about differentiable real functions.
- C06: Student will have a working knowledge of differentiability for complex functions and be familiar with the Cauchy-Riemann equations;
- C07: Student will evaluate integrals along a path in the complex plane and understand the statement of Cauchy's Theorem.
- C08: Justify the need for a Complex Number System and explain how is related to other existing number systems.
- C09: Define a function of complex variable and carry out basic mathematical operation with complex numbers.
- C010: Know the condition(s) for a complex variable function to be analytic and/or harmonic functions
- C011: Equation and use it to show that a function is analytic define singularities of a function, know the different types of singularities, and be able to determine the points of singularities of a function
- C012: Demonstrate familiarity with a range of examples of these concepts.
- C013: Apply the methods of complex analysis to evaluate definite integrals and infinite series.

### Paper – IV Topology

After the completion of the course, Students will be able to

- CO1: Demonstrate an understanding of the concepts of metric spaces and topological spaces, and their role in mathematics.
- CO2: Demonstrate familiarity with a range of examples of these structures.

- C03:** Prove basic results about completeness, compactness, connectedness and convergence within these structures.
- C04:** Use the Banach fixed point theorem to demonstrate the existence and uniqueness of solutions to differential equations.
- C05:** Demonstrate an understanding of the concepts of Hilbert spaces and Banach spaces, and their role in mathematics.
- C06:** Demonstrate familiarity with a range of examples of these structures.
- C07:** Prove basic results about Hilbert spaces and Banach spaces and operators between such spaces.
- C08:** Apply the theory in the course to solve a variety of problems at an appropriate level of difficulty.

### **Paper – V Theory of Ordinary Differential Equations**

After the completion of the course, Students will be able to

- C01:** The study of Differential course on the existence and uniqueness of solutions and also analysis the rigorous justification of methods for approximating solutions in pure and applied mathematics.
- C02:** Theory of ordinary differential equations is widely used in formulating many fundamental laws of physics and chemistry.
- C03:** Theory of differential equation is used in economics and biology to model the behaviour of complex systems.
- C04:** Differential equations have a remarkable ability to predict the world around us.
- C05:** They can describe exponential growth and decay population growth of species or change in investment return over time.
- C06:** Analyze real world scenarios to recognize when ordinary differential equations (ODEs) or systems of ODEs are appropriate, formulate problems about the scenarios, creatively model these scenarios (using technology, if appropriate) in order to solve the problems using multiple approaches, judge if the results are reasonable, and then interpret and clearly communicate the results.
- C07:** Recognize ODEs and system of ODEs concepts that are encountered in the real world, understand and be able to communicate the underlying mathematics involved to help another person gain insight into the situation.
- C08:** Work with ODEs and systems of ODEs in various situations and use correct mathematical terminology, notation, and symbolic processes in order to engage in work, study, and conversation on topics involving ODEs and systems of ODEs with colleagues in the field of mathematics, science or engineering.

### SEM III

#### PAPER – I Functional Analysis

After the completion of the course, Students will be able to

- C01: To learn to recognize the fundamental properties of normed spaces and of the transformations between them.
- C02: Understand the notions of dot product and Hilbert space and apply the spectral theorem to the resolution of integral equations.
- C03: Correlate Functional Analysis to problems arising in Partial Differential Equations, Measure Theory and other branches of Mathematics.
- C04: Appreciate how functional analysis uses and unifies ideas from vector spaces, the theory of metrics, and complex analysis.
- C05: Understand and apply fundamental theorems from the theory of normed and Banach spaces, including the Hahn-Banach theorem, the open mapping theorem, the closed graph theorem, and the Stone-Weierstrass theorem.
- C06: Appreciate the role of Zorn's lemma.
- C07: Understand and apply ideas from the theory of Hilbert spaces to other areas, including Fourier series, the theory of Fredholm operators, and wavelet analysis.
- C08: Understand the fundamentals of spectral theory, and appreciate some of its power.

#### PAPER – II General Measure & Integration

After the completion of the course, Students will be able to

- C01: Verify whether a given subset of  $\mathbb{R}$  or a real valued function is measurable.
- C02: Understand the requirement and the concept of the Lebesgue integral (a generalization of the Riemann integration) along its properties.
- C03: Demonstrate understanding of the statement and proofs of the fundamental integral convergence theorems, and their applications.
- C04: Introduce the concepts of functions of bounded variations and the absolute continuity of functions with their relations.
- C05: Extend the concept of outer measure in an abstract space and integration with respect to a measure.
- C06: Learn and apply Holder and Minkowski inequalities in  $L_p$ -spaces, completeness of  $L_p$ -spaces and convergence in measures.

#### PAPER – III Linear Algebra

After the completion of the course, Students will be able to

- C01: Determine the existence and uniqueness of the solution of a linear system,  $A\vec{x} = \vec{b}$  and find all solutions by choosing an effective method such as Gaussian elimination, inverting  $A$ , a suitable factorization or diagonalization of  $A$ , etc.
- C02: Find the dimension and basis of a given vector space.
- C03: Write down the matrix representing a linear transformation (such as projection, rotation, dilation, etc.) under a given basis, and determine how the matrix changes if the basis is changed.
- C04: Find the Gram-Schmidt orthogonalization of a matrix.
- C05: Determine the rank, determinant, eigen values and eigenvectors, diagonalization, and different factorizations of a matrix.
- C06: Solve systems of linear equations using multiple methods, including Gaussian elimination and matrix inversion.
- C07: Carry out matrix operations, including inverses and determinants.
- C08: Demonstrate understanding of the concepts of vector space and subspace.
- C09: Demonstrate understanding of linear independence, span, and basis.
- C010: Determine eigen values and eigenvectors and solve eigen value problems.

C011: Apply principles of matrix algebra to linear transformations.  
C012: Demonstrate understanding of inner products and associated norms.

#### **PAPER – IV A Operation Research**

After the completion of the course, Students will be able to

- C01: To develop linear programming (LP) models for shortest path, maximum flow, minimal spanning tree, critical path, minimum cost flow, and transshipment problems.
- C02: To formulate a given simplified description of a suitable real-world problem as a linear programming model in general, standard and canonical forms
- C03: To sketch a graphical representation of a two-dimensional linear programming model given in general, standard or canonical form
- C04: To classify a two-dimensional linear programming model by the type of its solution
- C05: To solve a two-dimensional linear programming problem graphically
- C06: To use the simplex method to solve small linear programming models by hand, given a basic feasible point.
- C07: To Express the concepts of factorial and the basic principal of counting.
- C08: To Solve the problems about permutation, combination and Binomial Theorem.
- C09: To express the concept of probability and its features.
- C010: To Explain the concept of a random event.
- C011: To Formulate theorems about the concept of probability.
- C012: To explain the concept of a random variable and the probability distributions.
- C013: To Express the features of discrete and continuous random variables.

#### **PAPER – IVB Mathematical Statistics**

After the completion of the course, Students will be able to

- C01: Graduates should be able to critically evaluate the strengths and weaknesses of study designs and can select a study design that is appropriate for addressing a specific research question.
- C02: Graduates should be able to use statistical reasoning, formulate a problem in statistical terms, perform exploratory analysis of data by graphical and other means, and carry out a variety of formal inference procedures.
- C03: Graduates should be able to describe important theoretical results and understand how they can be applied to answer statistical questions.
- C04: Graduates should have familiarity with a standard statistical software packages and encourage study of data management and algorithmic problem solving.
- C05: Graduates should have strong communication skills which are necessary to effectively collaborate as part of interdisciplinary teams including the ability to interpret and communicate the results of a statistical analysis through oral and written reports.

### **PAPER – IV C Advanced Complex Analysis**

After the completion of the course, Students will be able to

- C01: identify curves and regions in the complex plane defined by simple expressions.
- C02: Describe basic properties of complex integration and having the ability to compute such integrals.
- C03: Decide when and where a given function is analytic and be able to find its series development.
- C04: Describe conformal mappings between various plane regions.
- C05: Present the central ideas in the solution of Dirichlet's problem.
- C06: Give the main ideas in the proof of the Riemann mapping theorem.

### **PAPER – V A Mechanics**

After the completion of the course, Students will be able to

- C01: Relative motion, Inertial and non inertial reference frames.
- C02: Parameters defining the motion of mechanical systems and their degrees of freedom.
- C03: Study of the interaction of forces between solids in mechanical systems.
- C04: Centre of mass and inertia tensor of mechanical systems.
- C05: Application of the vector theorems of mechanics and interpretation of their results.
- C06: Newton's laws of motion and conservation principles.
- C07: Introduction to analytical mechanics as a systematic tool for problem solving.
- C08: Use of mechanical simulation software.

### **PAPER – V B Numerical Analysis**

After the completion of the course, Students will be able to

- C01: Understanding the theoretical and practical aspects of the use of numerical methods
- C02: Implementing numerical methods for a variety of multidisciplinary applications
- C03: Establishing the limitations, advantages, and disadvantages of numerical methods
- C04: It is used for solving a system of equations
- C05: It has application in all branches of engineering.
- C06: To know how to find the roots of transcendental equations.
- C07: To learn how to interpolate the given set of values
- C08: To understand the curve fitting for various polynomials To learn numerical solution of differential equations

### **PAPER – VC Differential Geometry**

After the completion of the course, Students will be able to

- C01: Explain the concepts and language of differential geometry and its role in modern mathematics.
- C02: Analyse and solve complex problems using appropriate techniques from differential geometry.
- C03: Apply problem-solving with differential geometry to diverse situations in physics, engineering or other mathematical contexts.
- C04: Apply differential geometry techniques to specific research problems in mathematics or other fields.

## **SEM IV**

### **PAPER – I**

#### **Integral equations & Calculus of Variation**

After the completion of the course, Students will be able to

- C01: Understand the methods to reduce Initial value problems associated with linear differential equations to various integral equations.
- C02: Categorise and solve different integral equations using various techniques.
- C03: Describe importance of Green's function method for solving boundary value problems associated with nonhomogeneous ordinary and partial differential equations, especially the Sturm-Liouville boundary value problems.
- C04: Learn methods to solve various mathematical and physical problems using variational techniques.
- C05: understand what functionals are, and have some appreciation of their applications
- C06: apply the formula that determines stationary paths of a functional to deduce the differential equations for stationary paths in simple cases
- C07: use the Euler-Lagrange equation or its first integral to find differential equations for stationary paths
- C08: solve differential equations for stationary paths, subject to boundary conditions, in straightforward cases.

### **PAPER – II Elementary Operator Theory**

After the completion of the course, Students will be able to

- C01: This is an introductory course in Operator Theory. It will introduce the student to terms, concepts and results for bounded linear operators which are commonly used in this particular area of Mathematics.
- C02: It will also introduce the students which are relevant to current research and prepare the student to pursue such a career.
- C03: special classes of bounded linear operator and study why each of them is important and significant.
- C04: a parallel study of unbounded linear operator is also done to give the student a complete perspective

### **PAPER – III Analytical Number Theory**

After the completion of the course, Students will be able to

- C01: Demonstrate an understanding of Analytic Number Theory by proving unseen results using the
- C02: methods of the course.
- C03: Correctly state the main definitions and theorems in the course.
- C04: Produce examples and counterexamples illustrating the mathematical concepts presented in the
- C05: course.
- C06: Explain their reasoning about rigorous Analytic Number Theory clearly and precisely, using appropriate
- C07: technical language.
- C08: Understand better the distribution of prime numbers
- C09: Know the basic theory of zeta- and L-functions
- C010: Understand the proof of Dirichlet's Theorem

### **PAPER – IV A Integral Transforms**

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

- C01: Solve differential & integral equations with initial conditions using Laplace transform.
- C02: Evaluate the Fourier transform of a continuous function and be familiar with its basic properties.
- C03: Solution of integral equation and their application.
- C04: Have understanding regarding different kind of integral transforms.
- C05: Understand Fourier transform and its properties and will be able to solve the examples based on it. □
- C06: Have deep understanding of Laplace Transformation and its real life application. □
- C07: Solve initial value problem and boundary value problem using Laplace Transform. □
- C08: Derive Fourier series representation of Periodic functions.

#### **PAPER – IVB Graph Theory**

After the completion of the course, Students will be able to

- C01: State all of the technical definitions covered in the course (such as a graph, tree, planar graph, colouring, digraph, generating function, linear extension, and other terms).
- C02: State all of the relevant theorems covered in the course.
- C03: Use these definitions and theorems from memory to construct solutions to problems and/or proofs.
- C04: Formulate graph theoretic models to solve real world problems (e.g., scheduling problems).
- C05: Analyze combinatorial objects satisfying certain properties and answer questions related to existence (proving the existence or non-existence of such objects), construction (describing how to create such objects in the case they exist), enumeration (computing the number of such objects), and optimization (determining which objects satisfy a certain extremal property).

#### **PAPER – IV C Cryptography**

The student who successfully completes this course will be able to:

- C01: classify the symmetric encryption techniques
- C02: Illustrate various Public key cryptographic techniques
- C03: Evaluate the authentication and hash algorithms.
- C04: Discuss authentication applications
- C05: Summarize the intrusion detection and its solutions to overcome the attacks.
- C06: Basic concepts of system level security

#### **PAPER – V A Fluid Mechanics**

After the completion of the course, Students will be able to

- C01: The student will understand stress-strain relationship in fluids, classify their behavior and also establish force balance in static systems. Further they would develop dimensionless groups that help in scale-up and scale-down of fluid flow systems. (Unit I)
- C02: Students will be able to apply Bernoulli principle and compute pressure drop in flow systems of different configurations (Unit II)
- C03: Students will compute power requirement in fixed bed system and determine minimum fluidization velocity in fluidized bed (Unit III)
- C04: Students will be able to describe function of flow metering devices and apply Bernoulli equation to determine the performance of flow-metering devices
- C05: Students will be able to determine and analyze the performance aspects of fluid machinery specifically for centrifugal pump and reciprocating pump

#### **PAPER – V B Advanced Operations Research**

After the completion of the course, Students will be able to



C01: Identify and develop operational research models from the verbal description of the real system.  
C02: Understand the mathematical tools that are needed to solve optimisation problems.  
C03: Use mathematical software to solve the proposed models.  
C04: Develop a report that describes the model and the solving technique, analyse the results and propose recommendations in language understandable to the decision-making processes in Management Engineering.

**PAPER – VC    Finite Difference Method**

After the completion of the course, Students will be able to

C01: Ability to solve the system of linear equations and finding eigenvalues of the matrices.  
C02: Perform polynomial interpolations using various techniques.  
C03: Perform Cubic-spline interpolation and approximations.  
C04: To understand numerical errors and obtain roots of system of nonlinear equations.  
C05: Perform Numerical Differentiation, Numerical Integration.  
C06: Solve IVP, BVP and numerical solutions of parabolic, elliptic and hyperbolic partial  
C07: differential equations.  
C08: Apply various numerical techniques in real life problems.

### **M.Sc. Statistics - Program outcomes**

PO1	Understand the basic concepts, fundamental principles and the scientific theories related to Statistics and Data Science.
PO2	To provide theoretical foundations that will motivate and prepare the students to take up theoretical and applied research in statistics.
PO3	Collect and Analyze the real time data manually and systematically and the ability to draw the objective conclusions.
PO4	Focus on algorithms, designs and advanced softwares to give statistical solutions to real life problems.
PO5	Choose appropriate statistical methods and demonstrate their ability to apply various concepts in exploratory data analysis
PO6	To carry out data analysis using different statistical software like Python, IBM SPSS, R, Microsoft excel, etc...
PO7	Prepared to expand career in the field of Data Science.
PO8	Apply Knowledge and understanding of principles of mathematics and statistics effectively as an individual, and as a member or leader in diverse teams to manage projects in multidisciplinary environment.

### **M.Sc. Statistics - Program specific outcomes**

PSO1	Students will be enriched with technical skills used in statistical data science, data analytics through projects including big data.
PSO2	Students are enhanced with the skills of creating taxonomy of cognitive domain in Statistics(Knowledge, Comprehension, Application, Analysis, Synthesis, evaluation)
PSO3	Student is equipped with statistical modeling ability, problem solving skills, creative talent and power of communication necessary for various kinds of employment. Students are stimulated with self learning skills that help them in research work in future and also to perform in NET, SLET, GATE and ISS (Indian Statistical Service).
PSO4	Students can synthesize their statistical expertise in Medical research, Finance and can work as a prominent part in the medical survey, research analytics.
PSO5	Students will be able to do Statistical softwares which will be very useful for their research programs.
PSO6	Elective papers in PG Program enable the students to face the real time applications and more useful for the students to do their research programs in future.

### **M.Sc. Statistics - Course outcomes**

<b>Paper</b>	<b>Course Outcomes</b>
Linear Algebra and Linear models	Understand abstract ideas and rigorous methods in mathematical analysis to solve practical problems. Describe fundamental properties of the real numbers that lead to the formal development of real analysis. Comprehend rigorous arguments developing the theory underpinning real analysis. Demonstrate an understanding of limits and how they are used in sequences, series, differentiation and integration. Construct rigorous mathematical proofs of basic results in real analysis.
Probability Theory	Learning to analysis the measure and measurable functions, definition of random variable, distribution function and concepts of convergence of distribution. And Transferable skills: Ability to use abstract methods to solve problems. Ability to use a wide range of references and critical thinking.
Distribution Theory and Estimation Theory	Understand the most common discrete and continuous probability distributions and their real life applications. Apply compound, Truncated, mixture and non-central probability distributions to solve problems. Analysis marginal and conditional distributions from joint distributions. Acumen to apply standard discrete probability distribution to different situations.
Sampling Theory and survey	Understand the basic principles underlying survey design and estimation. Apply the different sampling methods for designing and selecting a sample from a population. Implement Cluster sampling, Ratio and Regression estimation in real life problems. To apply various sampling methods for agricultural data.
Statistical Inference	<p>Understanding a fundamental of Parametric models for developing relevant inferences on associated parameters. Knowledge of point and interval estimation procedures and different methods of point estimation. To evaluate understand the Cramer-Rao Inequality, Rao Blackwell and Lehmann Scheffe theorems and their applications in obtaining Minimum Variance Unbiased and Minimum Variance Bound estimators.</p> <p>To obtained the gained the SPRT procedure for using the various most powerful invariant tests. Understand problem of statistical inference, problem of testing of hypothesis and construct SPRT in case of Binomial, Poisson, and Normal Distribution. Developed the knowledge for the field for fundamental lemma's and theorems.</p>
Applied Regression Analysis	Understand multiple linear regression models with applications and concept of Multi-collinearity and autocorrelation. Compute multiple and partial correlation and checking residual diagnostic to validate model. Apply simple linear regression model to real life examples. Develop a deeper understanding of the linear regression model. Differentiate between linear and non-linear regression and how to apply them in real life situations.
Multivariate Data Analysis	Understand Wishart distribution, Hotelling $T^2$ and Mahalanobis $D^2$ statistic. Implement dimension reduction techniques using software on real life problems. Demonstrate knowledge and understanding of the basic ideas behind discriminant and clustering analysis techniques with applications. Gaining the knowledge for the Multiple and Partial Correlation and their tests of

	significance, Multivariate Normal Distribution and its properties
Design of Experiments	Describe how to design experiments, carry them out, and analyze the data they yield. Examine how a factorial design allows cost reduction, increases efficiency of experimentation, and reveals the essential nature of a process; and discuss its advantages to those who conduct the experiments as well as those to whom the results are reported. Construct fractional factorial experiments and apply confounding in real life problems. Evaluate the analysis of BIBD, PBIBD, Latin square, Youden square and cross over design and their applications in agriculture, business and industries.
Operations Research - I	Students learn conversion of real life problems into mathematical models which enhance their problem solving and decision making abilities. Students learn to calculate optimal solution of models through graphical and iterative methods. Students study transportation and assignment models and methods to solve them. This helps them to get optimum solutions within the given constraints to problems arising in industry. Be able to build and solve Game theory, PERT/ CPM, simulation, investment analysis with real life applications.
Forecasting Models	Demonstrate knowledge of, and a critical understanding of, the main concepts of time series analysis. Demonstrate knowledge of, and a critical understanding of, the main properties of MA, AR, ARMA, ARIMA models. Use least squares, maximum likelihood and other methods to fit time series models to the data. Select proper model(s) using e.g. AIC or BIC. Fit trend and seasonal trend to the data, and fit time series models to the residuals. Understand methods used to produce forecasts.
Reliability Theory	Upon completion of this subject student's will have knowledge of Lifetime data and its distribution. Modeling of such data sets. Computing expected lifetime. Identifying significant factors affecting lifetime. Computing reliability of different systems and its components.
Data Modeling using Machine learning techniques	Analyze the data and understand the insights from it. Understanding supervised, unsupervised and reinforcement learning algorithms. A clear understanding of machine learning algorithms and applications. Apply various ML techniques as per the requirements. To acquaint important multivariate Methods. Apply clustering methods. Familiarize SVM, classification and regression trees
Statistical Quality and Process Control	The students will acquire understand basic of production process monitoring and apply concept of control charts on it. Apply the acceptance and continuous sampling plans in production process. Know and apply the concept of weighted control charts, six sigma, ISO: 2000 series standards and designs. Effectively interpret the results from the control charts

Applied Stochastic Processes	Understand the stochastic processes, Markov chains, Transition probability matrix and various types of states. Explain Random walk, Gambler ruins problem and apply Poisson process in real life situations. Understand renewal theory and branching processes with applications. Also Stochastic process to developing in time according to Markov chains, Poisson process, the vital process and queues. Solve differential equations for distributions and expectations in time continuous processes and determine corresponding limit distributions
Operations Research - II	Set up decision models and use some solution methods for nonlinear optimization problems. Analyze the general nonlinear programming problems. Formulate the nonlinear programming models. Use some solution methods for solving the nonlinear optimization problems. Explain the lagrange's multipliers. Show the Kuhn-Tucker optimality conditions. Propose the best strategy using decision making methods under uncertainty and game theory. Select the best strategy on the basis of decision criteria under risk. Select the best strategy on the basis of decision criteria under the uncertainty. Determine the best choice using decision tree. Solve the zero-sum two- person games. Solve multi-level decision problems using dynamic programming method. Explain fundamentals of dynamic programming. Use deterministic and stochastic dynamic programming approaches.
Artificial Neural Networks	Understand the difference between biological neuron and artificial neuron. Understand the application areas of neural networks. Understand building blocks of Neural Networks. Develop neural network models. Design and develop applications using neural networks.