



GSFC
UNIVERSITY
EDUCATION RE-ENVISIONED
An ISO 9001:2015 Certified

COURSE CURRICULUM

BS – MS Pharmaceutical Science

Batch:2026-2031
Academic Year: 2026-27
Updated on: May, 2026

GSFC University

School of Science, Vigyan Bhavan, P. O. Fertilizernagar, Vadodara - 391750, Gujarat, India

UNIVERSITY VISION:

GSFC University envisions becoming a research-oriented and innovation-driven university that leads in emerging and futuristic domains. With a student-centric ethos and strong human values, it strives to nurture entrepreneurial, future-ready, employable, and socially responsible graduates with a global outlook.

UNIVERSITY MISSION

- Achieve academic excellence through student-centric, outcome-based, and globally aligned pharmaceutical education while fostering scientific temperament, ethical values, and professional responsibility.
- Prepare competent and future-ready pharmaceutical professionals through holistic development, industry-oriented training, healthcare awareness, and research-driven learning.
- Promote research, innovation, and interdisciplinary collaboration in pharmaceutical sciences, healthcare, biotechnology, and emerging therapeutic technologies to address societal and industrial challenges.
- Encourage entrepreneurship, innovation, and startup culture through industry interaction, translational research, and pharmaceutical product development ecosystems.

DEPARTMENT VISION:

- To emerge as a nationally recognized center of excellence in Pharmaceutical Science education and research by developing ethical, industry-ready, research-oriented, and socially responsible pharmaceutical professionals contributing to healthcare innovation and sustainable development.

DEPARTMENT MISSION:

- **Build Strong Scientific Foundations:** Impart rigorous theoretical and practical training in pharmaceutical sciences including pharmaceutics, pharmaceutical chemistry, pharmacology, biotechnology, pharmaceutical analysis, and healthcare systems.
- **Enable Emerging Pharmaceutical Technologies:** Equip students with advanced laboratory skills, analytical instrumentation techniques, AI-enabled healthcare applications, drug discovery approaches, and modern pharmaceutical technologies through experiential learning.

- **Promote Research and Innovation:** Encourage interdisciplinary, industry-oriented, and translational research in pharmaceutical sciences, healthcare systems, novel therapeutics, and quality assurance while promoting ethical scientific practices.
- **Develop Industry-Ready Professionals:** Enhance employability and professional competency through internships, industrial training, research projects, regulatory exposure, soft-skill development, and continuous curriculum upgradation aligned with pharmaceutical industry and global healthcare requirements.

ABOUT THE PROGRAM:

The Integrated BS–MS Pharmaceutical Science programme is a multidisciplinary and research-oriented programme designed to provide strong theoretical knowledge, laboratory skills, industrial exposure, and research competency in pharmaceutical sciences. The curriculum integrates pharmaceutical chemistry, pharmaceutics, pharmacology, biotechnology, pharmaceutical analysis, healthcare systems, and modern pharmaceutical technologies.

Programme Highlights

- Strong foundation in pharmaceutical sciences, chemistry, biology, and healthcare systems.
- Industry-oriented curriculum with laboratory training, internships, and industrial exposure.
- Research-focused learning through projects, dissertation work, and advanced analytical studies.
- Inclusion of emerging areas such as AI in healthcare, healthcare analytics, bioinformatics, nanotechnology, and advanced drug delivery systems.
- Training in pharmaceutical analysis, quality assurance, regulatory affairs, validation, and intellectual property rights.
- Development of professional ethics, environmental awareness, healthcare responsibility, and sustainable practices.
- Focus on employability, entrepreneurship, innovation, and problem-solving skills.

- Preparation for careers in pharmaceutical industries, healthcare sectors, biotechnology companies, clinical research, academia, and higher education.

5th Year Advantage (NEP 2020)

- Advanced specialization in modern pharmaceutical sciences and therapeutics.
- Dedicated master's research and industrial project exposure.
- Enhanced opportunities for R&D, PhD programmes, and global higher education.
- Alignment with international academic and pharmaceutical industry standards.
- Strong professional and research competency for leadership roles in healthcare and pharmaceutical sectors.

Program Outcomes (POs):

No.	Programme Outcomes (POs)	Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
PO1	Basic Knowledge: To impart knowledge regarding fundamental concepts of pharmaceutical sciences including chemistry, biology, pharmaceutics, pharmacology, pharmaceutical analysis and biotechnology.	Cognitive Domain	Understand, Apply
PO2	Interdisciplinary Approach: To explain the relationships among pharmaceutical sciences, chemical sciences, biological sciences, computational sciences and healthcare systems.	Cognitive Domain	Apply, Analyze
PO3	Practical Learning and Problem Solving: To develop laboratory competency, analytical thinking, formulation development skills and scientific problem-solving abilities.	Cognitive Domain	Apply, Create
PO4	Effective Communication and Social Interaction: To communicate scientific and technical information effectively through oral, written and digital modes.	Cognitive Domain	Evaluate, Analyze
PO5	Ethics and Professionalism: To understand ethical practices, regulatory guidelines, research	Cognitive Domain	Apply, Create



No.	Programme Outcomes (POs)	Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
	integrity and professional responsibilities in pharmaceutical sciences.		
PO6	Environment and Sustainability: To understand sustainable pharmaceutical practices, environmental safety, green chemistry and conservation of natural resources.	Cognitive Domain	Analyze, Create

Program Specific Outcomes (PSOs):

No.	Programme Specific Outcomes (PSOs)	Blooms' Taxonomy Domain	Blooms' Taxonomy SubDomain
PSO 1	Students will gain and apply knowledge of pharmaceutical sciences, medicinal chemistry, pharmaceuticals, pharmacology, biotechnology and analytical sciences to solve pharmaceutical problems.	Cognitive Domain	Remember, Apply, Create
PSO 2	Students will demonstrate multidisciplinary teamwork, leadership and collaborative learning skills in healthcare and pharmaceutical sectors.	Cognitive Domain	Analyze, Evaluate
PSO 3	Students will design and develop sustainable pharmaceutical formulations and healthcare solutions using scientific and technological	Cognitive Domain	Apply, Create

No.	Programme Specific Outcomes (PSOs)	Blooms' Taxonomy Domain	Blooms' Taxonomy SubDomain
	approaches.		
PSO4	Students will demonstrate effective scientific communication, technical writing, presentation and documentation skills.	Cognitive Domain	Understand, Analyze
PSO5	Students will understand professional ethics, regulatory compliance, GMP, GLP and responsible conduct in pharmaceutical sciences and research.	Cognitive Domain	Apply, Create
PSO6	Students will design experiments, analyze data, interpret scientific findings and conduct research using modern pharmaceutical and computational tools.	Cognitive Domain	Analyze, Create

Mapping of POs & PSOs:

	PO1	PO2	PO3	PO4	PO5	PO6
PSO1	3	1	2	1	2	2
PSO2	2	3	2	2	1	3
PSO3	3	2	3	1	2	3
PSO4	1	3	1	3	2	2
PSO5	2	2	2	2	3	2
PSO6	2	1	3	1	2	2

1: Slight (Low); 2: Moderate (Medium); 3: Substantial (High); - None



Definition of Credit:

1 Hour. Lecture (L) per week	1 credit
1 Hour Tutorial (T) per week	1 credit
4 Hours Practical (P) per week	2 credit
2 Hours Practical (P) per week	1 credit
1 Hour Practical (P) per week	0.5 credit
3 Hours Experiential learning	1 credit

Course code Definitions:

Lecture	L
Tutorial	T
Practical	P
Mid Semester	MS
Continuous Evaluation Component	CEC
End Semester	ES
Pharmaceutical Science subject	BMP
Non-credit courses	NC
Project (Experiential learning)	PROJ
Experiential learning ex. Internship, Industrial Visit, Field visit, etc.	EL
Multidisciplinary courses	MDC
Ability Enhancement Course	AEC
Skill Enhancement Course	SCE
Value Added Courses	VAC



Structure of Programme:

Sr. No.	Category of the Course	Credits		
		3 Year BS	4 Year BS (H) / BS(H) Research	5 Year BS – MS
1.	Major	75	97	130
2.	Minor	24	32	32
3.	Interdisciplinary	12	12	12
4.	Ability Enhancement	10	10	10
5.	Skill Enhancement	10	10	10
6.	Value Added Course	10	10	10
7	Research Work		12	20
Total		141	183	224

Category-wise Courses:

Major Courses

(i) Number of Professional Core Courses: 39

(ii) Credits: 130

Sr. No.	Course Code	Course Name	Sem	Teaching Scheme (Hours/week)				Teaching Credit			
				L	P	T	Total	L	P	T	Total
1	BMP0101	General Chemistry	I	3	2	0	5	3	1	0	4
2	BMP0102	Cell Biology & Human Physiology	I	3	0	0	3	3	0	0	3
3	BMP0103	Introduction to Pharmaceutical Science	I	3	0	0	3	3	0	0	3
4	BMP0104	Mathematics for Pharmaceutical Science	I	2	0	0	2	2	0	0	2
5	BMP0201	Organic Chemistry	II	3	2	0	5	3	1	0	4
6	BMP0202	Biochemistry	II	3	2	0	5	3	1	0	4



7	BMP0203	Pharmaceutical Laboratory – I	II	0	4	0	4	0	2	0	2
8	BMP0204	Pharmaceutical Laboratory – II	II	0	4	0	4	0	2	0	2
9	BMP0301	Physical Pharmaceutics	III	2	2	0	4	2	1	0	3
10	BMP0302	Pharmacognosy	III	3	0	0	3	3	0	0	3
11	BMP0303	Pharmaceutical Microbiology	III	2	2	0	4	2	1	0	3
12	BMP0304	Pharmaceutical Analysis – I	III	0	4	0	4	0	2	0	2
13	BMP0305	Pharmaceutical Analysis – II	III	0	4	0	4	0	2	0	2
14	BMP0401	Medicinal Chemistry – I	IV	3	0	0	3	3	0	0	3
15	BMP0402	Pharmacology – I	IV	3	0	0	3	3	0	0	3
16	BMP0403	Pharmaceutics – I	IV	3	0	0	3	3	0	0	3
17	BMP0404	Pharmaceutical Analysis – II	IV	0	4	0	4	0	2	0	2
18	BMP0405	Analytical Instrumentation	IV	0	4	0	4	0	2	0	2
19	BMP0501	Medicinal Chemistry – II	V	3	0	0	3	3	0	0	3
20	BMP0502	Pharmacology – II	V	3	0	0	3	3	0	0	3
21	BMP0503	Pharmaceutics – II	V	3	0	0	3	3	0	0	3
22	BMP0504	Biopharmaceutics & Pharmacokinetics	V	2	2	0	4	2	1	0	3
23	BMP0601	Clinical Pharmacy	VI	3	0	0	3	3	0	0	3
24	BMP0602	Pharmaceutical Biotechnology	VI	3	0	0	3	3	0	0	3
25	BMP0603	Pharmaceutical Quality Assurance	VI	3	0	0	3	3	0	0	3



26	BMP0604	Pharmacology Lab	VI	0	4	0	4	0	2	0	2
27	BMP0605	Pharmaceutics Lab	VI	0	4	0	4	0	2	0	2
28	BMP0701	Advanced Medicinal Chemistry	VII	4	0	0	4	4	0	0	4
29	BMP0702	Advanced Pharmacology	VII	4	0	0	4	4	0	0	4
30	BMP0703	Industrial Pharmacy	VII	3	0	0	3	3	0	0	3
31	BMP0801	Clinical Research & Pharmacovigilance	VIII	4	0	0	4	4	0	0	4
32	BMP0802	Advanced Pharmaceutical Analysis – I	VIII	4	0	0	4	4	0	0	4
33	BMP0803	Validation & Regulatory Compliance	VIII	3	0	0	3	3	0	0	3
34	BMP0901	Advanced Drug Delivery Systems	IX	4	2	0	6	4	1	0	5
35	BMP0902	Nanotechnology & Novel Therapies	IX	4	2	0	6	4	1	0	5
36	BMP0903	Ayurveda	IX	5	0	0	5	5	0	0	5
37	BMP0904	Homeopathy	IX	5	0	0	5	5	0	0	5
38	BMP0905	Advanced Pharmacokinetics	IX	4	0	0	4	4	0	0	4
39	BMP0906	Advanced Pharmaceutical Analysis – I	IX	2	4	0	6	2	2	0	4
40		Comprehensive Viva	X	0	0	0	0	0	0	0	5
		Total									130

Note: L = Lecture, P = Practice, T= Tutorial

Minor Courses

(i) Number of Professional Elective Course: 8

(ii) Credits: 32

Sr. No.	Course Code	Course Name	Sem	Teaching Scheme (Hours/week)				Teaching Credit			
				L	P	T	Total	L	P	T	Total
1	BMP0105	Basic Computer Applications	I	3	2	0	5	3	1	0	4
2	BMP0205	Statistics Basics	II	3	0	1	4	3	1	0	4
3	BMP0306	Entrepreneurship Basics	III	4	0	0	4	4	0	0	4
4	BMP0406	Business Management	IV	4	0	0	4	4	0	0	4
5	BMP0505	Regulatory Affairs	V	4	0	0	4	4	0	0	4
6	BMP0606	Intellectual Property Rights	VI	4	0	0	4	4	0	0	4
7	BMP0704	Pharmaceutical Marketing	VII	4	0	0	4	4	0	0	4
8	BMP0804	Financial Management	VIII	4	0	0	4	4	0	0	4
Total											32

Note: L = Lecture, P = Practice, T= Tutorial

Interdisciplinary Courses

(i) Number of Professional Elective Course: 4

(ii) Credits: 12

Sr. No.	Course Code	Course Name	Sem	Teaching Scheme (Hours/week)				Teaching Credit			
				L	P	T	Total	L	P	T	Total
1	BMP0308	<i>AI and Data Science in Healthcare</i>	III	2	0	1	3	2	0	1	3
2	BMP0408	<i>Public Health System</i>	IV	3	0	0	3	3	0	0	3
3	BMP0507	<i>Healthcare Analytics</i>	V	2	0	1	3	2	0	1	3
4	BMP0608	<i>Start-up & Industry Interface</i>	VI	2	0	1	3	2	0	1	3
		Total									12

Note: L = Lecture, P = Practice, T= Tutorial

Ability Enhancement Courses

(i) Number of Ability enhancement compulsory Course: 5

(ii) Credits: 10

Sr. No.	Course Code	Course Name	Sem	Teaching Scheme (Hours/week)				Teaching Credit			
				L	P	T	Total	L	P	T	Total
1	AECC111	Fundamentals of English	I	2	0	0	2	2	0	0	2
2	AECC201	Communication Skills in English	II	2	0	0	2	2	0	0	2

3	AECC301	Environmental Studies	III	2	0	0	2	2	0	0	2
4	AECC401	Disaster Risk Management	IV	2	0	0	2	2	0	0	2
5	AECC311	Entrepreneurship development and Innovation	V	2	0	0	2	2	0	0	2
		Total					10				10

Note: L = Lecture, P = Practice, T= Tutorial

(i) Number of Indian Knowledge system Elective Course offered: 3

(Students shall choose any one course)

(ii) Credits: 2

Sr. No.	Course Code	Course Name	Sem	Teaching Scheme (Hours/week)				Teaching Credit			
				L	P	T	Total	L	P	T	Total
2	VACC105	Yoga and Wellness	I	0	2	2	2	0	1	1	2
3	VACC106	Introduction to Indian Knowledge System	I	2	0	0		2	0	0	
4	VACC301	Vedic Mathematics	I	2	0	0		2	0	0	
		Total					2				2

Note: L = Lecture, P = Practice, T= Tutorial

Skill Enhancement Courses

(i) Number of Professional Elective Course: 5

(i) Credits: 10

Sr. No.	Course Code	Course Name	Sem	Teaching Scheme (Hours/week)				Teaching Credit			
				L	P	T	Total	L	P	T	Total
1	BMP0206	<i>Internship - I (Laboratory Safety & Practices)</i>	II	0	0	2	2	0	0	2	2
2	BMP0307	<i>Internship - II (Basic Analytical Skills)</i>	III	0	0	2	2	0	0	2	2
3	BMP0407	<i>Paten Review</i>	IV	0	2	1	2	0	1	1	2
4	BMP0506	<i>Internship – III (Instrumentation Skills)</i>	v	0	0	2	2	0	0	2	2
5	BMP0607	<i>Internship – IV (Instrumentation Skills)</i>	VI	0	0	2	2	0	0	2	2
Total											10

Value Added Courses

(i) Number of Professional Elective Course: 4

(ii) Credits: 8

Sr. No.	Course Code	Course Name	Sem	Teaching Scheme (Hours/week)				Teaching Credit			
				L	P	T	Total	L	P	T	Total
1	VACC101	Foundation Course	I	0	0	0	8	0	4	0	4

2	SECC201	Indian Constitution	II	2	0	0	2	2	0	0	2
3	SECC301	Leadership & Teambuilding Skills	III	2	0	0	2	2	0	0	2
4	SECC401	Presentation & Placement Skills	IV	1	2	0	3	1	1	0	2
		Total					15				10

Note: L = Lecture, P = Practice, T= Tutorial

(i) Number of Value-added courses Indian Knowledge system Elective

Course offered: 3 (Students shall choose any one course)

(ii) Credits: 2

Sr. No.	Course Code	Course Name	Sem	Teaching Scheme (Hours/week)				Teaching Credit			
				L	P	T	Total	L	P	T	Total
1	VACC105	Yoga and Wellness	I	0	2	2	2	0	1	1	2
2	VACC106	Introduction to Indian Knowledge System	I	2	0	0		2	0	0	
3	VACC301	Vedic Mathematics	I	2	0	0		2	0	0	
		Total					2				2

Note: L = Lecture, P = Practice, T= Tutorial

Research Work

(i) Number of Research / Industry Project Work, Research Methodology:5

(ii) Credits: 20



Sr. No.	Course Code	Course Name	Sem	Teaching Scheme (Hours/week)				Teaching Credit			
				L	P	T	Total	L	P	T	Total
1.	BMP0705	Research Methodology	VII	2	0	0	2	2	0	0	2
2.	BMP0706 or BMP0707	Research / Industry Project	VII	0	8	0	8	0	4	0	4
3.	BMP0805 or BMP0806	Research / Industry Project	VIII	0	12	0	12	0	6	0	6
4.	BMP0907	Master's Research	IX	0	8	0	8	0	4	0	4
5.	BMP1002	Master's Research	X	0	8	0	8	0	4	0	4
		Total									20

Note: L = Lecture, P = Practice, T= Tutorial



Teaching Scheme Semester – I

Semester – I							
Sr. No.	Course Code	Course Title	L	T	P	C	Marks
A. Ability Enhancement Compulsory Course							
1	AECC111	Fundamentals of English	2	0	0	2	100
B. Value Added Compulsory Course							
2	VACC101	Foundation Course	0	0	4	4	100
C. Major Course							
3	BMP0101	General Chemistry	3	0	1	4	150
4	BMP0102	Cell Biology & Human Physiology	3	0	0	3	100
5	BMP0103	Introduction to Pharmaceutical Science	3	0	0	3	100
6	BMP0104	Mathematics for Pharmaceutical Science	2	0	0	2	100
D. Minor Course							
7	BMP0105	Basic Computer Applications	3	0	1	4	150
E. Value Added Elective Course							
8	VACC105	Yoga and Wellness	0	1	1	2	100
9	VACC106	Introduction to Indian Knowledge System	2	0	0		
10	VACC301	Vedic Mathematics	2	0	0		
Total						24	900



COURSE CODE AECC111	COURSE NAME FUNDAMENTALS OF ENGLISH	SEMESTER I
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
30	00	00	30	2	00	00	2

Course pre-requisites	Student should have cleared 12th Science
Course Category	Mandatory Course
Course focus	Skills Development
Rationale	It enables learners to apply basic English knowledge to handle day-to-day Business interactions.
Course Revision/ Approval Date:	27/04/2026
Course Objectives	After completion of the course, students will be able to CO1. To strengthen core linguistic competence (grammar, syntax, structure). CO2. To develop reading habits for academic and professional growth. CO3. To enhance vocabulary through structured and contextual exposure. CO4. To build effective writing skills for academic and workplace communication. CO5. To develop oral communication and interpersonal competence.



	CO6. To prepare learners for industry-ready communication demands	
Course Content (Theory)	Weightage	Contact hours
Unit 1: Fundamentals of Language - Parts of Speech (functional approach) - Word Formation (prefix, suffix, root words) - Basic sentence formation - Synonyms, antonyms, homophones - Standard abbreviations in academic/professional contexts Outcome Focus: Linguistic foundation and accuracy	20%	6
Unit 2: Vocabulary Development and Reading Culture - Types of vocabulary: academic, technical, general - Contextual vocabulary learning (learning through reading) - Word families, collocations, and usage patterns - Root-based vocabulary building (Latin/Greek roots – basic exposure) - Reading-based vocabulary tasks: - Newspaper analysis (editorial sections) - Discipline-specific articles (basic level) - Vocabulary notebooks and digital tools - Weekly vocabulary targets and usage practice	20%	6
Unit 3: Sentence Mechanics and Structure - Types of sentences (functional use) - Phrase and clause structures - Punctuation and clarity - Determiners and quantifiers	20%	6



Common structural errors Outcome Focus: Structural correctness and clarity		
Unit 4: Academic and Functional Writing Paragraph writing (coherence and cohesion) - Essay writing (analytical and descriptive) - Report writing (basic format) - Notice and memo drafting - Introduction to professional email writing Outcome Focus: Workplace-oriented writing competence	20%	6
Unit 5 Communication and Speaking Skills interaction - JAM (Just a Minute) - Group discussion and basic debate - Role-play (real-life scenarios: meetings, appointments, problem-solving) - Confidence-building strategies Outcome Focus: Industry-relevant communication skills	20%	6
Course Outcomes:		
After successful completion of the above course, students will be able to: CO1: Apply and manipulate fundamental grammatical rules and language structures to construct error-free sentences in varied contexts. (Apply) CO2: Analyze and interpret written texts to infer meaning, evaluate arguments, and demonstrate advanced reading comprehension. (Analyze) CO3: Select and employ domain-specific vocabulary appropriately in oral and written communication across academic and professional contexts. (Apply) CO4: Compose and organize coherent academic and professional texts using appropriate structure,		

style, and conventions. (Create)

CO5: Articulate and adapt communication effectively in formal and informal situations with clarity, confidence, and contextual appropriateness. (Apply–Analyze)

Learning Resources	
1.	Textbook: Wren & Martin (2001), English Grammar & Composition, New York
2.	Reference Books Raymond Murphy – English Grammar in Use Edgar Thorpe – Basic Vocabulary David Green – Contemporary English Grammar Additional Resources Newspaper Editorials (The Hindu / Indian Express)
3	Harvard Business Review (selected simplified readings) Online vocabulary platforms (e.g., vocabulary apps, corpora-based tools)

Evaluation Scheme	Total Marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	5 marks
	MCQs	10 marks
	Article Review	15 marks
	Open Book Examination	10 marks
	Total	40 Marks

Mapping of PSOs & COs



	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
C01	1	1	-	-	-	-	-	-
C02	1	1	-	-	-	-	-	-
C03	1	1	-	-	-	-	-	-
C04	1	1	-	-	-	-	-	-
C05	1	1	-	-	-	-	-	-

Mapping of POs & COs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
C01	3	2	2	2	-	-	-	-
C02	3	3	2	2	-	-	-	-
C03	3	3	2	2	-	-	-	-
C04	3	3	3	3	-	-	-	-
C05	3	2	2	2	-	-	-	-

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0101	COURSE NAME GENERAL CHEMISTRY	SEMESTER I
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
45	30	00	75	3	1	0	4

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Mandatory Course
Course focus	To develop fundamental chemical principles and their pharmaceutical applications required for advanced pharmaceutical sciences.
Rationale	General Chemistry forms the foundation for understanding pharmaceutical sciences, medicinal chemistry, analytical chemistry, pharmaceuticals, and biochemistry. The course introduces essential chemical principles required for drug design, formulation, analysis, and biological interactions.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand atomic structure, chemical bonding, and physicochemical properties relevant to pharmaceutical sciences. CO2. Apply stoichiometric principles, thermodynamics, chemical equilibrium, and buffer systems in pharmaceutical calculations and formulations. CO3. Explain the fundamentals of quantum chemistry and relate molecular structure and intermolecular

	interactions to pharmaceutical sciences. CO4. Understand pharmaceutical and bioinorganic chemistry concepts associated with biological systems and metal-based therapeutics. CO5. Apply fundamental chemistry concepts and laboratory techniques in pharmaceutical analysis, formulation development, and research.		
Course Content (Theory)		Weightage	Contact hours
Unit I: Atomic Structure and Chemical Bonding Quantum numbers, atomic orbitals, electronic configuration, periodic properties, ionic bonding, covalent bonding, coordinate bonding, molecular orbital theory, hybridization, intermolecular forces		20%	9
Unit II: Stoichiometry and Chemical Reactions Mole concept, concentration systems, stoichiometric calculations, balancing chemical equations, limiting reagent, oxidation-reduction reactions, pharmaceutical calculations		20%	9
Unit III: Thermodynamics and Chemical Equilibrium Laws of thermodynamics, enthalpy, entropy, Gibbs free energy, chemical equilibrium, ionic equilibrium, pH, buffer systems, pharmaceutical applications		20%	9
Unit IV: Fundamentals of Quantum Chemistry and its Pharmaceutical Applications Introduction to quantum chemistry, molecular geometry, intermolecular interactions, basics of computational chemistry, molecular modeling, drug-receptor interactions and applications of		20%	9

quantum chemistry in drug discovery, QSAR and pharmaceutical research.		
Unit V: Pharmaceutical and Bioinorganic Chemistry Coordination compounds, chelation therapy, medicinal inorganic chemistry, metal complexes, iron biochemistry, calcium biochemistry, cytochrome P450 system, cisplatin and metal-based drugs.	20%	9

	Practical	Weightage	Contact hours
	To provide hands-on training in fundamental chemistry laboratory techniques and analytical methods relevant to pharmaceutical sciences, enabling students to develop essential experimental skills required for pharmaceutical education, research, quality control, and industrial applications.	100%	30

Instructional Method and Pedagogy:

Utilizing models, PowerPoint Presentations, films on various topics of physical chemistry, group discussions, quizzes and seminars are some of the methods adopted to improve the student ability to grasp the principles of physical chemistry. The hands-on sessions during laboratory sessions will help students to apply the concepts learnt and analyse the results and draw conclusion.

Course Outcome:	Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:		

CO1	Explain atomic structure, chemical bonding and periodic properties relevant to pharmaceutical sciences.	Cognitive	Understand
CO2	Apply stoichiometric, thermodynamic and equilibrium principles in pharmaceutical systems.	Cognitive	Apply
CO3	Explain the fundamentals of quantum chemistry and correlate molecular structure with pharmaceutical properties and drug discovery.	Cognitive	Analyse
CO4	Analyze the role of inorganic compounds and metal ions in biological and pharmaceutical systems.	Cognitive	Analyse
CO5	Apply chemical concepts and laboratory skills in pharmaceutical analysis and research.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Atkins' Physical Chemistry – Peter Atkins 2. Inorganic Pharmaceutical Chemistry – P. Gundu Rao 3. Inorganic Pharmaceutical Chemistry – Chatwal & Anand 4. University General Chemistry – C.N.R. Rao 5. Inorganic Chemistry – J.D. Lee 6. Pharmaceutical Chemistry – Chatwal & Anand 7. Essentials of Physical Chemistry – Bahl & Tuli

2.	Reference Books 1. Vogel's Textbook of Quantitative Chemical Analysis 2. Indian Pharmacopoeia (IP 2026) 3. Remington: The Science and Practice of Pharmacy 4. Medicinal Inorganic Chemistry – Debasis Das 5. Principles of Physical Chemistry – Puri, Sharma & Pathania 6. Indian Pharmacopoeia (Latest Edition) 7. Quantum Chemistry 8. Introduction to computational chemistry
3	Other material:

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks
Practical Marks	Attendance	05 marks
	Practical Exam	20 marks
	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks
	Quantity of the Project/Industrial in terms of Language, Presentation &	20 marks



Project/ Industrial Internship Marks	format.	
	Practical understanding of the subject on the Project/Industrial	10 marks
	Industry/ University mentor's feedback on the Project/ Industrial.	10 marks
	Attendance	10 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	1	1	-	1
CO2	3	1	2	1	-	2
CO3	2	1	1	1	1	3
CO4	2	1	2	1	2	2
CO5	3	1	2	1	1	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	2	1	1	-	-
CO2	3	2	2	1	-	1
CO3	2	2	3	1	1	1
CO4	2	2	2	1	2	2
CO5	3	2	3	1	1	2

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0102	COURSE NAME CELL BIOLOGY & HUMAN PHYSIOLOGY	SEMESTER I
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
45	0	0	45	3	0	0	3

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Mandatory Course
Course focus	To provide fundamental understanding of cellular organization and human physiological systems relevant to pharmaceutical sciences.
Rationale	The course introduces the structural and functional organization of cells and human body systems essential for understanding pharmacology, pathology and therapeutics. It builds a biological Foundation Course required for advanced pharmaceutical and biomedical studies.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand cellular organization and biomolecular functions. CO2. Explain structure and physiology of major human organ systems. CO3. Correlate physiological mechanisms with pharmaceutical applications. CO4. Understand homeostasis and biological regulation mechanisms.

	CO5. Develop foundational biological knowledge for advanced pharmaceutical sciences.	
Course Content (Theory)	Weightage	Contact hours
Unit I: Cell Structure and Biomolecules Cell theory, prokaryotic and eukaryotic cells, plasma membrane, nucleus, mitochondria, endoplasmic reticulum, Golgi apparatus, lysosomes, ribosomes, carbohydrates, proteins, lipids, nucleic acids.	20%	9
Unit II: Cell Division and Genetics Cell cycle, mitosis, meiosis, chromosomes, DNA replication, RNA synthesis, protein synthesis, mutations, genetic inheritance	20%	9
Unit III: Human Physiology – I Blood composition, blood groups, cardiovascular system, cardiac cycle, respiratory system, mechanism of respiration	20%	9
Unit IV: Human Physiology – II Digestive system, enzymes, absorption, excretion, urinary system, endocrine glands, hormones	20%	9
Unit V: Nervous and Musculoskeletal System Neuron structure, nerve impulse transmission, central nervous system, muscular system, skeletal system, homeostasis	20%	9

Instructional Method and Pedagogy:

Utilizing models, PowerPoint Presentations, films on various topics of physical chemistry, group discussions, quizzes and seminars are some of the methods adopted to improve the student ability to grasp the principles of physical chemistry. The hands-on sessions during laboratory sessions will help students

to apply the concepts learnt and analyze the results and draw conclusion.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain atomic structure, chemical bonding and periodic properties relevant to pharmaceutical sciences.	Cognitive Domain	Understand
CO2	Apply stoichiometric, thermodynamic and equilibrium principles in pharmaceutical systems.	Cognitive Domain	Understand, Apply
CO3	Interpret electrochemical phenomena and analytical methods used in pharmaceutical sciences.	Cognitive Domain	Analyze
CO4	Analyze the role of inorganic compounds and metal ions in biological and pharmaceutical systems.	Cognitive Domain	Apply
CO5	Apply chemical concepts and laboratory skills in pharmaceutical analysis and research.	Cognitive Domain	Analyze, Apply

Learning Resources	
1.	Textbooks

	1. Guyton & Hall Human Physiology; Textbook of Physiology – A.K. Jain 2. Human Physiology – Guyton and Hall 3. Cell Biology – C.B. Powar 4. Essentials of Medical Physiology – Sembulingam 5. Textbook of Physiology – A.K. Jain 6. Cell and Molecular Biology – De Robertis
2.	Reference Books 1. Lehninger Principles of Biochemistry 2. Molecular Biology of the Cell – Alberts 3. Human Anatomy and Physiology – Tortora 4. Essentials of Human Physiology for Pharmacy 5. Harper's Illustrated Biochemistry

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	1	1	-	1

CO2	3	1	1	1	-	2
CO3	3	1	2	1	1	2
CO4	2	1	2	1	1	2
CO5	2	2	2	1	1	2

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	2	1	1	-	-
CO2	3	2	1	1	-	-
CO3	3	2	2	1	1	1
CO4	2	2	2	1	1	1
CO5	2	2	2	1	1	1

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0103	COURSE NAME INTRODUCTION TO PHARMACEUTICAL SCIENCE	SEMESTER I
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
45	0	0	45	3	0	0	3

Course Pre-requisites	Students should have successfully completed 10+2 Science stream with Chemistry and Biology/Mathematics from a recognized board.
Course Category	Mandatory Course



Course focus	To introduce students to the fundamentals, scope and interdisciplinary nature of pharmaceutical sciences.		
Rationale	The course familiarizes students with the pharmaceutical profession, drug development processes and healthcare systems. It provides foundational knowledge regarding pharmaceutical industries, dosage forms, regulations and emerging pharmaceutical technologies.		
Course Revision/ Approval Date:	22/05/2026		
Course Objectives	After completion of the course, students will be able to: CO1. Understand the scope and branches of pharmaceutical sciences. CO2. Explain drug discovery, development and dosage forms. CO3. Understand pharmaceutical industries and regulatory systems. CO4. Introduce pharmaceutical ethics and healthcare responsibilities. CO5. Develop awareness regarding emerging pharmaceutical technologies		
Course Content (Theory)		Weightage	Contact hours
Unit I: Introduction to Pharmaceutical Sciences			
History of pharmacy, scope of pharmaceutical sciences, branches of pharmacy, roles of pharmacists, healthcare systems		20%	9
Unit II: Drug Discovery and Development			
Drug discovery process, preclinical studies, clinical		20%	9

trials, drug approval, intellectual property rights		
Unit III: Pharmaceutical Dosage Forms Tablets, capsules, syrups, injections, ointments, novel drug delivery systems, packaging systems	20%	9
Unit IV: Pharmaceutical Industries and Regulations GMP, GLP, pharmaceutical industries, quality assurance, quality control, regulatory authorities, pharmacopoeias	20%	9
Unit V: Emerging Pharmaceutical Technologies Biotechnology, nanotechnology, pharmacovigilance, AI in healthcare, precision medicine, bioinformatics	20%	9

Instructional Method and Pedagogy:

Utilizing models, PowerPoint Presentations, films on various topics of physical chemistry, group discussions, quizzes and seminars are some of the methods adopted to improve the student ability to grasp the principles of physical chemistry. The hands-on sessions during laboratory sessions will help students to apply the concepts learnt and analyze the results and draw conclusion.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain the scope and interdisciplinary nature of pharmaceutical sciences.	Cognitive Domain	Understand
CO2	Describe drug discovery and	Cognitive	Understand,

	development processes.	Domain	Analyze
CO3	Identify pharmaceutical dosage forms and industrial practices.	Cognitive Domain	Apply
CO4	Explain pharmaceutical regulations, ethics and quality systems.	Cognitive Domain	Analyze
CO5	Interpret emerging pharmaceutical technologies and healthcare innovations.	Cognitive Domain	Analyze, Create

Learning Resources	
1.	Textbooks 1. Pharmaceutical Sciences – Remington 2. Introduction to Pharmaceutical Sciences – Satoskar 3. Theory and Practice of Industrial Pharmacy – Lachman 4. Essentials of Pharmaceutics – Carter 5. Pharmaceutical Jurisprudence – Kokate
2.	Reference Books 1. Indian Pharmacopoeia 2. USP Pharmacopoeia 3. Good Manufacturing Practices Guidelines 4. Drug Discovery and Development – Hill and Rang 5. Pharmaceutical Biotechnology – Crommelin 6. Remington; Drug Discovery & Development

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous	Attendance	10 marks



Evaluation Component Marks	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	1	1	1	1
CO2	3	1	1	1	1	2
CO3	3	1	2	1	2	2
CO4	2	1	2	1	3	2
CO5	2	2	3	1	1	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	2	1	1	1	-
CO2	3	2	2	1	1	-
CO3	3	2	2	1	2	1
CO4	2	2	2	1	3	1
CO5	2	3	2	1	1	2

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0104	COURSE NAME MATHEMATICS FOR PHARMACEUTICAL SCIENCE	SEMESTER I
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
30	0	0	30	2	0	0	2

Course Pre-requisites	Students should have successfully completed 10+2 Science stream with Mathematics as a subject from a recognized board.
Course Category	Mandatory Course
Course focus	To develop mathematical and statistical skills required for pharmaceutical calculations and scientific analysis.
Rationale	Mathematics provides analytical tools essential for pharmaceutical calculations, biostatistics, pharmacokinetics and research data interpretation. The course strengthens quantitative reasoning and problem-solving abilities required in pharmaceutical sciences
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand basic mathematical concepts used in pharmaceutical sciences. CO2. Apply algebraic and statistical methods in pharmaceutical calculations. CO3. Develop analytical and quantitative problem-solving skills. CO4. Interpret graphical and statistical pharmaceutical data. CO5. Apply mathematics in pharmacokinetics and research analysis.

Course Content (Theory)	Weightage	Contact hours
Unit I: Algebra and Functions Logarithms, exponential functions, equations, inequalities, matrices, determinants	20%	6
Unit II: Differential Calculus Limits, continuity, differentiation, maxima and minima, pharmaceutical applications	20%	6
Unit III: Integral Calculus Integration methods, definite integration, area calculations, pharmaceutical applications	20%	6
Unit IV: Statistics and Probability Mean, median, mode, standard deviation, probability distributions, correlation	20%	6
Unit V: Biostatistics and Pharmaceutical Applications Regression analysis, graphical analysis, pharmacokinetic calculations, dosage calculations	20%	6

Instructional Method and Pedagogy:

Utilizing models, PowerPoint Presentations, films on various topics of physical chemistry, group discussions, quizzes and seminars are some of the methods adopted to improve the student ability to grasp the principles of physical chemistry. The hands-on sessions during laboratory sessions will help students to apply the concepts learnt and analyze the results and draw conclusion.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain mathematical concepts relevant to pharmaceutical	Cognitive Domain	Understand

	sciences.		
CO2	Apply algebraic and calculus methods in pharmaceutical calculations.	Cognitive Domain	Apply
CO3	Interpret statistical data and probability concepts.	Cognitive Domain	Analyze
CO4	Analyze pharmaceutical and pharmacokinetic data using biostatistics.	Cognitive Domain	Analyze
CO5	Apply quantitative reasoning in pharmaceutical problem-solving and research.	Cognitive Domain	Apply, Create

Learning Resources	
1.	Textbooks 1. Ansel, H. C., & Stockton, S. J. (2017). <i>Pharmaceutical Calculations</i> (15th ed.). Wolters Kluwer, Philadelphia. 2. Grewal, B. S. (2021). <i>Higher Engineering Mathematics</i> (44th ed.). Khanna Publishers, New Delhi. 3. Mahajan, B. K. (2008). <i>Methods in Biostatistics: For Medical Students and Research Workers</i> (7th rev. ed.). Jaypee Brothers Medical Publishers, New Delhi. 4. Gupta, S. C., & Kapoor, V. K. (2020). <i>Fundamentals of Mathematical Statistics</i> (12th rev. and enl. ed.). Sultan Chand & Sons, New Delhi. 5. Bast, F. (2023). <i>Biostatistics and Mathematical Biology</i>. Pearson India.
2.	Reference Books 1. Bolton, S., & Bon, C. (2004). <i>Pharmaceutical Statistics: Practical and Clinical Applications</i> (4th ed.). Marcel Dekker, New York.

	2. Birkett, D. J. (2002). <i>Pharmacokinetics Made Easy</i> (2nd ed.). McGraw-Hill, Sydney. 3. Snedecor, G. W., & Cochran, W. G. (1989). <i>Statistical Methods</i> (8th ed.). Iowa State University Press, Ames, Iowa. 4. Kothari, C. R., & Garg, G. (2019). <i>Research Methodology: Methods and Techniques</i> (4th ed.). New Age International Publishers, New Delhi. 5. Bolton, S., & Bon, C. (2004). <i>Pharmaceutical Statistics: Practical and Clinical Applications</i> (4th ed.). Marcel Dekker, New York.
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Evaluation Scheme		Total Marks	
Theory: Mid semester Marks		20 marks	
Theory: End Semester Marks		40 marks	
Theory: Continuous Evaluation Component Marks		Attendance	10 marks
		MCQs	10 marks
		Skill enhancement activities / case study	10 marks
		Presentation/ miscellaneous activities	10 marks
		Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	1	1	-	1
CO2	3	1	1	1	-	2
CO3	2	1	1	1	-	3
CO4	2	1	2	1	1	3
CO5	3	1	2	1	1	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	2	1	1	-	-
CO2	3	2	2	1	-	-
CO3	2	2	2	1	-	1
CO4	2	2	3	1	1	1
CO5	3	2	3	1	1	1

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0105	COURSE NAME BASIC COMPUTER APPLICATIONS	SEMESTER I
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
45	30	0	75	3	1	0	4

Course Pre-requisites	Students should have successfully completed 10+2 Science stream from a recognized board with basic knowledge of computers.
Course Category	Core Professional
Course focus	To develop fundamental computer skills and digital competency for pharmaceutical education, research and healthcare applications.
Rationale	Computer applications play a significant role in pharmaceutical industries, healthcare systems, bioinformatics and research. The course provides essential computational knowledge and practical digital skills required for modern pharmaceutical sciences.



Course Revision/ Approval Date:	22/05/2026		
Course Objectives	After completion of the course, students will be able to: CO1. Understand basic computer systems and operating principles. CO2. Develop skills in office automation and data handling. CO3. Apply computer applications in pharmaceutical sciences. CO4. Understand internet technologies, databases and cybersecurity basics. CO5. Develop digital competency for research and healthcare applications.		
Course Content (Theory)		Weightage	Contact hours
Unit I: Fundamentals of Computers Computer organization, hardware, software, operating systems, memory devices, input-output devices		20%	9
Unit II: Office Automation Tools MS Word, MS Excel, MS PowerPoint, data management, charts, pharmaceutical data handling		20%	9
Unit III: Internet and Networking Internet applications, networking basics, cloud computing, email systems, cybersecurity basics		20%	9
Unit IV: Databases and Bioinformatics Database concepts, pharmaceutical databases, bioinformatics introduction, digital healthcare		20%	9
Unit V: Computer Applications in Pharmaceuticals AI in healthcare, pharmaceutical software, data analysis, e-prescriptions, telemedicine		20%	9

	Practical	Weightage	Contact hours
1	To develop fundamental computer skills through practical applications relevant to pharmaceutical sciences, enabling students to effectively use digital tools for scientific documentation, data analysis, presentations, literature search, and healthcare information management.	100%	30

Instructional Method and Pedagogy:

Utilizing models, PowerPoint Presentations, films on various topics of physical chemistry, group discussions, quizzes and seminars are some of the methods adopted to improve the student ability to grasp the principles of physical chemistry. The hands-on sessions during laboratory sessions will help students to apply the concepts learnt and analyse the results and draw conclusion.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain computer fundamentals and operating systems.	Cognitive Domain	Understand
CO2	Apply office automation tools for pharmaceutical documentation and data handling.	Cognitive Domain	Apply
CO3	Use internet technologies and databases for scientific information retrieval.	Cognitive Domain	Apply, Analyze
CO4	Interpret bioinformatics and digital healthcare applications.	Cognitive Domain	Analyze
CO5	Apply computational tools and	Cognitive	Apply, Create



	software in pharmaceutical sciences and research.	Domain	
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Learning Resources	
1.	Textbooks 1. Rajaraman, V., & Adabala, N. (2025). <i>Fundamentals of Computers</i> (7th ed.). 2. Agarwal, G., & Kaur, P. (2024). <i>Computer Applications in Pharmacy: Theory and Practical</i>. CBS Publishers & Distributors, New Delhi. 3. Lambert, J., & Frye, C. (2018). <i>Microsoft Office 2019 Step by Step</i>. Microsoft Press. 4. Rastogi, S. C., Rastogi, P., & Mendiratta, N. (2022). <i>Bioinformatics: Methods and Applications: Genomics, Proteomics and Drug Discovery</i> (5th ed.). 5. Hersh, W. R., & Hoyt, R. E. (2018). <i>Health Informatics: Practical Guide</i> (7th ed.).
2.	Reference Books 1. Sinha, P. K., & Sinha, P. (2021). <i>Computer Fundamentals: Concepts, Systems and Applications</i> (8th ed.). BPB Publications, New Delhi. 2. Raj Kamal. (2002). <i>Internet and Web Technologies</i>. Tata McGraw-Hill, New Delhi. This is a recognised Indian academic 3. Fassett, W. E., & Christensen, D. B. (Eds.). (1986). <i>Computer Applications in Pharmacy</i>. Lea & Febiger, Philadelphia. 4. Singh, P. K., Trovati, M., Murtagh, F., Atiquzzaman, M., & Farid, M. (Eds.). (2024). <i>Data Science and Artificial Intelligence for Digital Healthcare: Communications Technologies for Epidemic Models</i>. Springer. 5. Bohr, A., & Memarzadeh, K. (Eds.). (2020). <i>Artificial Intelligence in Healthcare</i>. Academic Press, an imprint of Elsevier.

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks
Practical Marks	Attendance	05 marks
	Practical Exam	20 marks
	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	1	1	-	-
CO2	2	3	2	1	-	1
CO3	2	3	2	1	-	1
CO4	2	2	3	2	1	2
CO5	2	2	3	2	1	2

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
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C01	2	2	1	1	-	-
C02	2	3	2	1	-	1
C03	2	3	2	2	-	1
C04	2	2	3	2	1	2
C05	2	2	3	2	1	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE: VACC105	COURSE NAME YOGA AND WELLNESS	SEMESTER -I
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
0	30	15	45	0	1	1	2

Course Prerequisites	Basic physical fitness; no prior yoga experience required.
Course Category	Life Skills (Value Aided Course -VAC)
Course Focus	Skill Development, Mental Health, and Physical Well-being
Rationale	In a high-pressure academic environment, students require tools to manage stress, improve posture, and maintain physical health. This course bridges ancient yogic wisdom with modern fitness needs.
Course Revision/ Approval Date:	16/07/2026
Course Objectives (As per Blooms' Taxonomy)	CO1. Remember: Recall terminology, sequences, and basic principles of yoga practices. CO2. Understand: Explain the physiological and psychological benefits of yoga. CO3. Apply: Demonstrate correct execution of asanas and pranayama safely. CO4. Analyze: Examine the impact of a sedentary lifestyle and the role of yoga interventions. CO5. Evaluate: Assess the effectiveness of yoga practices for stress and fitness management. CO6. Create: Design a personalized wellness/yoga routine.



Course Content	Weightage	Contact hours
Unit I: Foundations of Movement & Yogic Warm-up Concepts: Introduction to Yoga and Wellness; Philosophy of "Steady and Comfortable" (Sthira-Sukham). Practical: Sukshma Vyayama (Yogic Warm-up): Systematic joint movements from neck to toes. Specifics: Griva Shakti Vikasaka (Neck), Skandha Chakra (Shoulders), Kati Shakti Vikasaka (Trunk), and Janu Shakti Vikasaka (Knee).	30%	15
Unit II: Asana Dynamics, Core Strength & Fitness Concepts: Body Alignment and the Science of Stretching; Building Core Stability. Asanas (Practical): Standing: Tadasana, Vrikshasana, Trikonasana. Sitting: Paschimottanasana, Ardha Matsyendrasana, Vajrasana. Prone: Bhujangasana, Shalabhasana. Supine: Sarvangasana (or Setu Bandhasana), Shavasana. Fitness Integration: Sun Salutations (Surya Namaskar) for cardiovascular endurance and core engagement.	40%	15
Unit III: Pranayama & Modern Stress Recovery (20 Hours) Pranayama: Sectional breathing (Abdominal, Thoracic, Clavicular), Nadisodhana, and Bhramari. Relaxation Modalities: QRT (Quick Relaxation Technique): 2-minute body scanning. DRT (Deep Relaxation Technique): 15-minute guided Shavasana. Applied Yoga: Eye relaxation techniques (Trataka/Palming) and Desk-based stretches for wrist/spine health during long study hours.	30%	15

Course Outcomes

CO	Outcome	Domain	Action Verbs
CO1	Recall and describe yoga sequences	Remember	Recall, List, Describe
CO2	Perform asanas with proper alignment	Apply	Demonstrate, Execute
CO3	Analyze posture and effects of pranayama	Analyze	Compare, Differentiate
CO4	Design personalized yoga routines	Create	Design, Develop
CO5	Explain principles of relaxation techniques	Understand	Explain, Summarize

Learning Resources

1.	Text Books: Asana Pranayama Mudra Bandha – Swami Satyananda Saraswati (Yoga Publications Trust). <i>(The gold standard for practical step-by-step guidance).</i> Light on Yoga: Yoga Dipika – B.K.S. Iyengar (Schocken Books). <i>(Excellent for detailed anatomical alignment and posture photographs).</i> The Yoga Institute's Guide to Wellness – Hansaji Jayadeva Yogendra. <i>(Focuses on integrating yoga into daily lifestyle and mental health).</i>
2.	Reference Books: Yoga Anatomy – Leslie Kaminoff & Amy Matthews. <i>(Crucial for understanding the muscle mechanics and core strength aspects of Asanas).</i> The Heart of Yoga: Developing a Personal Practice – T.K.V. Desikachar.

	(Provides a framework for creating personalized routines as per CO4). Stress and Its Management by Yoga – K.N. Udupa. (A scientific reference for the physiology behind QRT, DRT, and Pranayama).
4.	Other Electronic Resources: (A) SWAYAM & NPTEL Platforms: Yoga and Positive Psychology for Managing Career and Life (IIT Bombay/NPTEL) • Yoga and Stress Management (Available via various university partners on Swayam). (B) MOOCs & International Platforms: • Yoga and Physiology (Coursera/NYU) – Understanding the physical impact of the practices. • Mindfulness and Resilience to Stress at Work (edX/UC Berkeley) – Complements the desk yoga and relaxation unit. (C) Government & Digital Libraries: • Ministry of AYUSH (Yoga Portal): Provides the <i>Common Yoga Protocol (CYP)</i> videos and downloadable manuals. yoga.ayush.gov.in • S-VYASA (Digital Repository): Access to research papers on the efficacy of QRT, DRT, and Cyclic Meditation. • Namaste Yoga App: A mobile resource provided by the Ministry of AYUSH for tracking daily practice and learning sequences.

Evaluation Scheme		Total Marks
Theory: Mid semester Marks		20 marks
Theory: End Semester Marks		40 marks



Theory: Continuous Evaluation Component Marks	Attendance	05 marks
	Practical exam	20 marks
	viva	15 marks
	Total	40 Marks

Program Outcomes (PO) Definitions:

PO1: Disciplinary Knowledge (Physical and mental health principles)

PO2: Problem Analysis (Identifying stress/posture issues)

PO3: Modern Tool Usage (Using the body and breath as tools for wellness)

PO4: Ethics & Discipline (Regularity and yogic conduct)

PO5: Individual & Team Work (Self-practice and group synchronization)

PO6: Communication Skills (Ability to demonstrate and explain)

PO7: Life-long Learning (Integration of yoga into a daily lifestyle)

CO-PO Mapping Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 (Recall sequences)	3	-	1	3	2	2	3
CO2 (Execute Asanas)	2	1	3	2	2	3	3
CO3 (Analyze limitations)	2	3	2	1	1	2	3
CO4 (Create routines)	3	3	3	1	-	2	3
CO5 (Understand/Summarize)	3	2	2	2	1	3	3
Average Mapping	2.6	1.8	2.2	1.8	1.2	2.4	3.0

Scale: 1: Slight (Low); 2: Moderate (Medium); 3: Substantial (High); -: None.

CO-PSO Mapping Matrix



.Course Outcome (CO)	PSO1	PSO2	PSO3
CO1: Recall and describe Sukshma Vyayama and Surya Namaskar sequences.	3	1	2
CO2: Execute Asanas with correct alignment and breath synchronization.	3	2	2
CO3: Analyze postural limitations and the effects of Pranayama .	2	3	3
CO4: Design personalized Desk Yoga and Eye Relaxation routines.	2	3	3
CO5: Summarize QRT/DRT principles for stress and core management.	2	3	3

COURSE CODE VACC106		COURSE NAME Introduction to Indian Knowledge System			SEMESTER 1		
Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
30	00	00	30	30	00	00	2

Rationale:	“बुद्धिं ज्ञानेन शुद्ध्यन्ति” (Buddhi Gyanen Shudhyanti) – Purification of mind and intellect through knowledge - Aligned with GSFC University's vision of fostering an innovation-driven, entrepreneurial, and sustainable mindset, this course introduces undergraduate students to India's rich intellectual heritage. It bridges classical wisdom with modern scientific paradigms, enabling industry readiness, environmental consciousness, and creative problem-solving.
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Course pre-requisites:	Nil (Open to all first-year UG students)		
Course Category	Ability Enhancement Compulsory Course (AECC) – IKS Aligned		
Course focus	Indian Knowledge Systems (IKS) + Value-Based Leadership and Ethical Development		
Course Revision Date:	16/07/2026		
Course Objectives (As per Bloom's Taxonomy)	1. To introduce the foundational frameworks, historical evolution, and philosophical pillars of the Indian Knowledge System (IKS). 2. To explore ancient India's breakthroughs in mathematics, astronomy, linguistics, health sciences, and sustainable engineering, demonstrating their modern relevance. 3. To align traditional wisdom with modern applications through hands-on case studies, connecting ancestral intelligence to entrepreneurial ("Mind-to-Market") opportunities.		
Course Content (Theory + Practical)		Weightage	Contact hours
Unit I: Introduction to IKS • Definition and characteristics of Indian Knowledge Systems. • Historical evolution from ancient times to the 18th century CE. • Impact of colonial education policies and the need for revisiting traditional knowledge. • Traditional educational institutions: Gurukuls, Pathshalas, Takshashila, and Nalanda. • Local heritage sites and their relevance.		20%	6



Unit II: Introduction to Ancient Indian Mathematics and Astronomy - Mathematics: Ancient numeral systems and mathematical concepts. - Logic: Indian logic systems and epistemology. - Overview of Indian astronomy; celestial coordinate systems and calendar systems - Astronomical Instruments (Yantras) - Application of Physics and Chemistry	20%	6
Unit III: Introduction to Health and Medicine - In-depth study of Ayurveda, its diagnostic methods, and therapeutic practices. - Understanding the holistic approach to health encompassing physical, mental, and spiritual well-being. - Application of Ayurveda principles in contemporary healthcare systems. - Ayurvedic perspectives on health, including dietary regimes, disease management, elements of wellness—and their intersections with botany and medical science	20%	6
Unit IV: Introduction to Ancient Governance and Public Administration - Analysis of ancient Indian governance models and administrative structures. - Insights from texts like Arthashastra on statecraft and economics. - Relevance of traditional governance principles in modern administrative practices. - Concept of Kingship; duties and responsibilities of a monarch	20%	6



• Three-tier political system: Dharmadanda, Rajdanda, Nyāyadanda • Law & administration, crime suppression, defence systems, foreign policy • Concept of wealth, ownership, and distribution • Kautilya's "Saptanga" model (seven sources of income) Taxation, savings, and expenditure in ancient Indian economy		
Unit V: Introduction to Ancient Arts and Culture • Study of traditional Indian art forms, including sculpture, dance, and music. • Understanding the cultural significance and philosophical underpinnings of these art forms. • Promotion of cultural heritage through education and practice. • Temple architecture overview • Cave and monolithic architecture • Architectural styles: Chalukya, Pallava, Chola, Hoysala, Mauryan, Vijayanagara • Buddhist and Jain art & architectural heritage	10%	6
Course Outcome: CO1: Understand the foundational structure, historical timeline, and core texts of Indian Knowledge Systems. CO2: Explain ancient Indian contributions to sciences, structural design, public administration, and language mechanics. CO3: Analyze traditional systems of health (Ayurveda) and ecological balance against modern scientific parameters. CO4: Apply principles of Vastu Shastra, corporate statecraft, and Vedic logic to design contemporary, sustainable solutions. CO5: Formulate innovative concepts or community-centric projects that synthesize historical		

knowledge with modern enterprise requirements.

Learning Resources

1.	Primary Sources: • Textbook 1c • Textbook 2: Kapoor, K., & Singh, A. K. (2010). <i>Indian Knowledge System (Vols. 1-2)</i>. D.K. Printworld. • Textbook 3: Jha, A. (2014). Traditional Knowledge System in India. Alpha Science International.
2.	Secondary Sources: 1. Source 1: <i>Kautilya's Arthashastra (Translated by R. Shamasastry)</i>. • Application: Book I & II for corporate governance frameworks, internal auditing, and the Saptanga structure. 2. Source 2: Al-Khalili, J. (<i>Selected Research Papers on Global History of Science</i>). • Application: Cross-comparative studies evaluating the transmission of Indian mathematical logic to the Greco-Arabic world.
3.	Online Digital Portals & Learning Repositories 1. IKS Division Portal (Ministry of Education, GoI): Access to peer-reviewed research papers, institutional repositories, and digital monographs on specialized ancient sciences. 2. National Digital Library of India (NDLI) - IKS Collection: Curated primary manuscripts, digitized translations of classical scientific texts (e.g., Aryabhatiya, Charaka Samhita). 3. Bharat Vidya Platform (Bhandarkar Oriental Research Institute): Modular video lectures and curated digital exhibitions focusing on epigraphy, scripts, and classical core philosophies.

	Recommended MOOCs & NPTEL Courses (SWAYAM Portal) 4. Course 1 (NPTEL - IIT Kharagpur): Introduction to Indian Knowledge Systems by Prof. B. Mahadevan. - Utility: Recommended for absolute theoretical alignment with the primary textbook and foundational clarity across Units 1 to 5. 5. Course 2 (NPTEL - IIT Madras): Sustainability in Traditional Indian Practices by Multidisciplinary Faculty. - Utility: Ideal supplementary certification for Unit 5, matching local eco-engineering with modern ESG targets. 6. Course 3 (SWAYAM - AICTE): Indian Knowledge System: Humanities & Social Sciences by IKS Division experts. - Utility: Deep dive into Unit 4 concepts including Kautilyan statecraft, financial instruments (Hundis), and ancient leadership paradigms.
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Evaluation Scheme		Total Marks
Component		Marks
"Mind-to-Market" Innovation Project & Pitch	Multi-disciplinary group project translating an ancient scientific/design concept (e.g., Ayurvedic wellness apps, Kautilyan startup models) into a viable modern business pitch.	20
Heritage Lab Field Visit & Analytical Report	A structural and ecological assessment report based on a field visit to local historical sites (e.g., Stepwells or Champaner-Pavagadh) to study ancient water harvesting and masonry geometry.	15
IKS Case Study Analysis (Comparative Study)	A critical written analysis comparing ancient Indian frameworks with modern structures (e.g., comparing Kautilya's Saptanga model to	15



	modern corporate governance or traditional farming to current ESG goals).	
Vedic Math & Computational Logic Challenge	Practical classroom assessment/hackathon focused on using Vedic mathematical algorithms and Paninian linguistic logic to solve modern numerical and optimization problems.	15
End-Semester Integrative Term Project/Paper	A comprehensive final submission (concept model, working prototype, or research paper) synthesizing historical wisdom with contemporary engineering, health, or management practices.	20
Total		100
Activities	Practices	
1. "Mind-to-Market" Innovation Labs	• Concept Re-Engineering: Deconstruct ancient Indian methodologies (e.g., Vrikshayurveda plant care, zinc distillation mechanics, or Vedic mathematical models). • Commercialization Pitch: Work in multidisciplinary teams to design and pitch a modern tech-startup model, software solution, or sustainable product line derived from these concepts.	
2. Tarka Shastra (Vedic Logic) & Math Hackathons	• Algorithmic Computation: Time-bound problem-solving challenges utilizing Vedic numeric principles to outpace standard calculator routines. • Paninian Code Analysis: Code-breaking exercises analyzing Panini's Ashtadhyayi framework to map structural grammar	

	against modern NLP (Natural Language Processing) and compiler design logic.
3. Heritage Lab & Eco-Architecture Field Work	• Field Documentation: Hands-on structural, spatial, and geometric analysis of local stepwells (Baolis) or structural marvels in the Gujarat region. • Sustainability Benchmarking: Measuring historical rainwater harvesting, structural cooling, and eco-balanced design features against modern global ESG parameters.
4. Arthashastra Governance Simulations	• Corporate Crisis Management: Role-playing as corporate advisory boards to address modern industry disruptions, financial turnarounds, or operational chaos using Kautilya's Saptanga (Seven Pillars) framework. • Regulatory Sandbox: Simulating regulatory structures balancing profit metrics with systemic ethics (Dharmadanda).
5. Charaka & Sushruta Preventive Health Trackers	• Tridosha Biomarker Audits: Applying the Vata-Pitta-Kapha model to personal diet, focus metrics, and circadian rhythm optimization over a 14-day study period. • Bio-Design Analysis: Group evaluations tracing modern surgical equipment lineages back to the mechanical blueprints outlined in the Sushrut Samhita.
6. Ancient Aesthetics & Metallurgy Showcases	• Rasa-Driven Interface Design: Developing product UI/UX strategies framed

	entirely on the emotional aesthetics of Bharata's Natyashastra Rasa Theory. • Material Science Exhibits: Interactive review of corrosion-resistant casting practices and high-strength crucible steel production for modern green manufacturing paradigms.
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Mapping of PSOs & COs

	PO1 Knowledge	PO2 Problem Solving	PO3 Communication	PO4 Ethics
CO1: Understand the foundational structure, historical timeline, and core texts of Indian Knowledge Systems.	3	1	2	3
CO2: Explain ancient Indian contributions to sciences, structural design, public administration, and language mechanics.	3	2	2	1
CO3: Analyze traditional systems of health (Ayurveda) and ecological balance against modern scientific parameters.	3	2	1	3
CO4: Apply principles of Vastu Shastra, corporate statecraft, and Vedic logic to design contemporary, sustainable solutions.	2	3	2	3
CO5: Formulate innovative concepts or community-centric projects that	3	2	3	3



synthesize historical knowledge with modern enterprise requirements.				
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Mapping of POs & Cos

	PO1 Knowledge	PO2 Problem Solving	PO3 Communication	PO4 Ethics
CO1: Understand the foundational structure, historical timeline, and core texts of Indian Knowledge Systems.	3	1	2	3
CO2: Explain ancient Indian contributions to sciences, structural design, public administration, and language mechanics.	3	2	2	1
CO3: Analyze traditional systems of health (Ayurveda) and ecological balance against modern scientific parameters.	3	2	1	3
CO4: Apply principles of Vastu Shastra, corporate statecraft, and Vedic logic to design contemporary, sustainable solutions.	2	3	2	3
CO5: Formulate innovative concepts or community-centric projects that synthesize	3	2	3	3



historical knowledge with modern enterprise requirements.				
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1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE VACC301	COURSE NAME Vedic Mathematics	SEMESTER I
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
30	0	0	30	2	0	0	2

Course Pre-requisites	None		
Course Category	Value Added Elective		
Course focus	Skill development		
Rationale	The present course will give the idea about different concepts of Vedic Mathematics like Arithmetic, Algebra, Geometry and Trigonometry.		
Course Revision/ Approval Date:	16/07/2026		
Course Objectives	To enable the student to: 1: Understand Concepts of Vedic Mathematics to promote joyful learning of mathematics. 2: Learn Vedic Mathematics to enhance computation skills. 3: Develop logical and analytical thinking 4: Apply Vedic mathematics to solve problems of Algebra, Geometry and Trigonometry. CO6. 5: Understand the rich heritage of mathematical temper of Ancient India		
Course Content (Theory)		Weightage	Contact hours
Unit 1: History of Vedic Maths and its Features, Vedic Maths formulae: Sutras and Upsutras Addition in		20%	6



Vedic Maths: Without carrying, Dot Method, Subtraction in Vedic Maths: Nikhilam Navatashcaramam Dashatah (All from 9 last from 10) , Fraction -Addition and Subtraction		
Unit 2: Miracle Multiplication and Excellent Division: Base Method, Multiplication by Urdhva Tiryak Sutra (any two numbers up to four digits), Miracle multiplication: Any number by series of 1's and 9's, Multiplication by 12, Division by Urdhva Tiryak Sutra (Vinculum method)"	20%	6
Unit 3: Lightening Squares and Rapid Cubes, Squares of any two-digit numbers: Base method, Square of numbers ending in 5: Ekadhikena Purvena Sutra, Square of any numbers using duplex, Easy square roots: Dwandwa Yoga (duplex) Sutra, Cubing: Yavadunam Sutra	20%	6
Unit 4: Square root of 2: Baudhayana Shulbasutra, Enlighten Algebra and Geometry, Factoring Quadratic equation: Anurupyena, Adyamadyenantyamanty Sutra, Concept of Baudhayana (Pythagoras) Theorem	20%	6
Unit 5: Circling a square: Baudhayana Shulbasutra, Concept of pi: Baudhayana Shulbasutra, Concept angle () 0o, 30o, 45o, 60o and 90o: Baudhayana number	20%	6

Instructional Method and Pedagogy:

Chalk & board, group discussions, assignments, , Online materials, Practice examples.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Apply techniques of Vedic Mathematics to solve the problems of Addition and subtraction.	Remember, Understand, Apply	Explain, Use, Solve,
CO2	Understand and Apply techniques of Vedic Mathematics to solve the problems of Multiplication and Division.	Remember, Understand, Apply	, Identify, Use, Solve
CO3	Apply techniques of Vedic Mathematics to find squares, cubes, square roots and Cube roots.	Understand, Apply	Describe, Identify, Solve, Use, Find
CO4	Understand and Apply techniques of Vedic Mathematics to solve quadratic equations.	Remember, Apply	Describe, Use, Solve
CO5	Understand the rich heritage of mathematical temper of Ancient India.	Understand	classify, Explain, Identify, Use, solve.

Learning Resources	
1.	Reference Books: 1. A Modern Introduction to Ancient Indian Mathematics, T S Bhanumurthy, Wiley Eastern Limited, New Delhi 2. Enjoy Vedic Mathematics, S M Chauthaiwale, R Kollaru, The Art of Living, Bangalore 3. Magical World of Mathematics, VG Unkalkar, Vandana Publishers, Bangalore. Text Books:
2.	Learning Resources 1. The Essential of Vedic Mathematics, Rajesh Kumar Thakur, Rupa Publications, New Delhi, 2019

	2. Vedic Mathematic by Bharati Krishna Tirthaji, Motilal Banarasidas, New Delhi, 2015.
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Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	5
	MCQs	10
	Open Book Assignment	15
	Article Review / Presentations / Practice Assignments	10
	Total	40

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	1	1	-	1
CO2	1	2	1	1	-	1
CO3	2	2	1	1	-	2
CO4	1	2	1	-	-	1
CO5	1	2	1	-	-	1

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	3	1	1	-	-
CO2	2	3	1	1	-	-
CO3	1	3	1	1	-	-
CO4	1	3	1	1	-	-



C05	2	3	1	1	-	-
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1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

Teaching Scheme Semester – II

Semester – II							
Sr. No.	Course Code	Course Title	L	T	P	C	Marks
A. Ability Enhancement Compulsory Course							
1	AECC201	Communication Skills in English	2	0	0	2	100
B. Value Added Course							
2	SECC201	Indian Constitution	2	0	0	2	100
C. Major Course							
3	BMP0201	Organic Chemistry	3	0	1	4	150
4	BMP0202	Biochemistry	3	0	1	4	150
5	BMP0203	Pharmaceutical Laboratory – I	0	0	2	2	50
6	BMP0204	Pharmaceutical Laboratory – II	0	0	2	2	50
D. Minor Course							
7	BMP0205	Statistics Basics	3	1	0	4	100
E. Skill Enhancement Course							
8	BMP0206	Internship - I (Laboratory Safety & Practices)	0	0	2	2	100
Total						22	800

COURSE CODE AECC201	COURSE NAME COMMUNICATION SKILLS IN ENGLISH - II	SEMESTER II
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
30	00	00	30	2	00	00	2

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Mandatory Course
Course focus	Communicational Skills in English
Rationale	It enables humanity to experience the benefits of chemistry when we apply it in the exploitation of materials and energy.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. To enable learners, develop their basic communication skills in English. CO2. To equip them with writing skills needed for academic as well as workplace context. CO3. To prepare students for professional communication at world level. CO4. To develop corporate communicational attitude. CO5. To strengthen digital communication using technological modules and expertise.

Course Content (Theory)	Weightage	Contact hours
Unit 1: Language Basics Parts of speech, word formation, prefix-suffix, synonyms, antonyms, homophones and standard abbreviations	20%	7
Unit 2: Elementary Reading/Writing Skills Types of the sentences, structures of the sentences, use of phrases and clauses, punctuation, creative writing and coherence, comprehension, essay, paragraph writing, creative writing	30%	8
Unit 3: Elementary Spoken Skills Greetings, farewell and introduction, making an apology, accepting an apology, making an appointment, JAM, group discussion, debate, public speaking	30%	7
Unit 4: Practicing and Identifying the Common Error Tense, subject-verb agreement, noun-pronoun agreement, articles, prepositions, modal auxiliaries, voice, reported speech	20%	8

Instructional Method and Pedagogy:

Classroom Lecture, Case Studies, Quizzes, Presentations, Role Play, Expert Lecture (Consultant)

Course Outcome	Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:		

CO1: To emphasize the development of listening and reading skills among learners	Understand, Analyse, Remember	Define, Classify & Demonstrate
CO2: To equip them with writing skills needed for academic as well as workplace context	Analyse, Apply, Understand	Classify, Describe & Demonstrate
CO3: To enable learners of Engineering and Technology to develop their basic communication skills in English	Understand, remember	Define, Describe & Demonstrate
CO4: To strengthen the fundamentals in English Language.	Remember, Analyse	Define Describe
CO5: To build up the confidence to communicate with the world.	Understand, Apply	Define, Classify, Describe & Demonstrate

Learning Resources	
1.	Textbook
2.	Reference books - Murphy, Raymond "Murphy's English Grammar with CD" Cambridge University Press, 2004. - Thorpe, Edgar and Showick Thorpe "Basic Vocabulary" Pearson Education India, 2012.

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	–	3	1	–
CO2	1	2	–	3	2	1
CO3	1	3	1	3	2	1
CO4	1	1	–	3	1	–



CO5	1	3	1	3	2	2
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Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	1	1	–	3	1	–
CO2	1	1	1	3	2	–
CO3	1	2	1	3	2	–
CO4	1	1	–	3	1	–
CO5	1	2	2	3	2	1

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); – None

COURSE CODE SECC201	COURSE NAME INDIAN CONSTITUTION	SEMESTER II
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
30	0	0	30	2	0	0	2

Course Pre-requisites	Students should have completed Semester I of the program.
Course Category	Mandatory Course
Course focus	To develop constitutional awareness, civic responsibility and understanding of fundamental rights, duties and governance systems in India.
Rationale	The course introduces constitutional values, democratic principles and legal frameworks essential for responsible citizenship and professional ethics. It enhances awareness regarding governance, rights, duties and national development.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand the historical development of the Indian Constitution. CO2. Explain fundamental rights, duties and directive principles. CO3. Understand the structure and functions of Indian governance. CO4. Develop awareness regarding constitutional ethics and social justice.

	CO5. Promote responsible citizenship and democratic values.	
Course Content (Theory)	Weightage	Contact hours
Unit I: Introduction to Constitution Historical background, constituent assembly, preamble, salient features of Indian Constitution.	20%	6
Unit II: Fundamental Rights and Duties Fundamental rights, directive principles, fundamental duties, constitutional remedies	20%	6
Unit III: Union and State Government Parliament, President, Prime Minister, Governor, Chief Minister, judiciary	20%	6
Unit IV: Constitutional Bodies and Amendments Election commission, finance commission, UPSC, constitutional amendments	20%	6
Unit V: Democracy and Social Justice Secularism, equality, social justice, human rights, constitutional ethics	20%	6

Instructional Method and Pedagogy:

Teaching through lectures, case studies, discussions and constitutional awareness activities.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain the historical development and features of the Indian Constitution.	Cognitive	Understand

CO2	Interpret fundamental rights, duties and directive principles.	Cognitive	Apply
CO3	Describe the structure and functioning of Indian governance systems.	Cognitive	Understand, analyse
CO4	Analyze constitutional bodies and democratic processes.	Cognitive	analyse
CO5	Apply constitutional values and ethical principles in professional and social life.	Cognitive	Apply, Evaluate

Learning Resources	
1.	Textbooks 1. Introduction to the Constitution of India – D.D. Basu 2. Indian Polity – M. Laxmikanth 3. Our Constitution – Subhash Kashyap 4. Constitutional Law of India – J.N. Pandey 5. Indian Constitution at Work – NCERT
2.	Reference Books 1. Constitution of India – Government of India 2. Indian Governance and Politics 3. Human Rights and Indian Constitution 4. Constitutional Developments in India 5. Public Administration and Governance

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous	Attendance	10 marks



Evaluation Component Marks	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	-	-	1	3	-
CO2	1	-	-	1	3	1
CO3	1	1	-	2	3	1
CO4	1	1	-	2	3	2
CO5	1	1	1	2	3	2

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	1	-	-	1	3	-
CO2	1	-	-	1	3	1
CO3	1	1	-	2	3	2
CO4	1	1	-	2	3	2
CO5	1	1	1	2	3	2

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0201	COURSE NAME ORGANIC CHEMISTRY - I	SEMESTER II
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
45	30	0	75	3	1	0	4

Course Pre-requisites	Students should have completed General Chemistry or equivalent chemistry background at 10+2 level.
Course Category	Mandatory Course
Course focus	To understand organic reaction mechanisms and pharmaceutical organic compounds.
Rationale	Organic Chemistry forms the foundation for medicinal chemistry, drug design and pharmaceutical synthesis. The course develops understanding of structure, stereochemistry and reactivity of pharmaceutical compounds.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand structure and bonding in organic molecules. CO2. Explain stereochemistry and reaction mechanisms. CO3. Apply concepts of organic reactions in pharmaceutical sciences.

	CO4. Understand synthesis and properties of pharmaceutical compounds. CO5. Develop analytical and problem-solving skills in organic chemistry.		
Course Content (Theory)		Weightage	Contact hours
Unit I: Structure and Bonding Hybridization, resonance, inductive effect, electrometric effect, hyper conjugation, acidity and basicity.		20%	9
Unit II: Stereochemistry Optical isomerism, chirality, enantiomers, diastereomers, conformational analysis.		20%	9
Unit III: Reaction Mechanisms Free radical reactions, nucleophilic substitution, electrophilic substitution, elimination reactions.		20%	9
Unit IV: Hydrocarbons and Aromatic Compound Alkanes, alkenes, alkynes, aromaticity, benzene chemistry.		20%	9
Unit V: Pharmaceutical Organic Compounds Alcohols, aldehydes, ketones, carboxylic acids, amines, heterocyclic compounds		20%	9

	Practical	Weightage	Contact hours
	Appropriate laboratory experiments, demonstrations, and skill-based exercises related to the course contents shall be conducted to reinforce theoretical concepts and develop professional competencies.	100%	30

Instructional Method and Pedagogy:

Teaching through lectures, tutorials, problem-solving sessions and laboratory demonstrations.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain structure, bonding and properties of organic compounds.	Cognitive	Understand
CO2	Interpret stereochemistry and isomerism in pharmaceutical molecules.	Cognitive	Apply
CO3	Analyze organic reaction mechanisms and reactivity patterns.	Cognitive	Analyze
CO4	Explain chemistry of hydrocarbons and aromatic compounds.	Cognitive	Analyze
CO5	Apply organic chemistry concepts in pharmaceutical synthesis and analysis.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Organic Chemistry – Morrison and Boyd 2. Organic Chemistry – I.L. Finar 3. Advanced Organic Chemistry – Carey 4. Organic Reaction Mechanisms 5. Pharmaceutical Organic Chemistry

	6. A Textbook of Organic Chemistry – Bahl & Bahl
2.	Reference Books 1. Vogel's Practical Organic Chemistry 2. Stereochemistry of Organic Compounds 3. Spectroscopy in Organic Chemistry 4. Practical Organic Chemistry 5. Medicinal Chemistry 6. Organic Synthesis Manuals

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks
Practical Marks	Attendance	05 marks
	Practical Exam	20 marks
	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	1	-	-	-
CO2	3	2	1	-	-	-
CO3	3	3	2	1	-	1
CO4	2	3	2	1	1	1
CO5	2	3	3	2	1	2

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	1	-	-	-	-
CO2	3	2	1	-	-	-
CO3	3	3	2	1	-	1
CO4	2	3	2	1	1	1
CO5	2	3	3	2	1	2

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0202				COURSE NAME BIOCHEMISTRY				SEMESTER II			
Teaching Scheme (Hours)				Teaching Credit							
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit				
45	30	0	75	3	1	0	4				

Course Pre-requisites	Students should have cleared 12 th Science
Course Category	Mandatory Course
Course focus	To understand biomolecules, metabolism and biochemical pathways relevant to healthcare sciences.

Rationale	The course provides fundamental knowledge of biomolecules, metabolic pathways, enzymes and biochemical processes essential for understanding human health, disease mechanisms and drug action. It establishes the biochemical foundation required for advanced studies in pharmacology, biotechnology, clinical pharmacy and pharmaceutical research.	
Course Revision/ Approval Date:	22/05/2026	
Course Objectives	After completion of the course, students will be able to: CO1. Understand biomolecules and metabolism. CO2. Explain enzymatic and biochemical pathways. CO3. Analyze metabolic disorders. CO4. Interpret biochemical laboratory investigations. CO5. Apply biochemical concepts in healthcare and pharmaceuticals.	
Course Content (Theory)	Weightage	Contact hours
Unit I: Biomolecules Carbohydrates, proteins, lipids, nucleic acids, amino acids.	20%	9
Unit II: Enzymes and Bioenergetics Enzyme kinetics, ATP generation, metabolism basics.	20%	9
Unit III: Carbohydrate Metabolism Glycolysis, TCA cycle, glycogen metabolism	20%	9
Unit IV: Lipid and Protein Metabolism Fatty acid metabolism, amino acid metabolism, urea cycle.	20%	9
Unit V: Molecular Biology and Biotechnology	20%	9

DNA replication, transcription, translation, recombinant DNA technology		
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	Practical	Weightage	Contact hours
	Appropriate laboratory experiments, demonstrations, and skill-based exercises related to the course contents shall be conducted to reinforce theoretical concepts and develop professional competencies.	100%	30

Instructional Method and Pedagogy:

Teaching through lectures, biochemical demonstrations, assignments and case-based Learning.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' TaxonomySub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain biomolecules and biochemical pathways in living systems	Cognitive	Understand
CO2	Apply biochemical concepts in pharmaceutical and healthcare sciences.	Cognitive	Apply
CO3	Analyze metabolism and enzymatic reactions critically.	Cognitive	Analyze
CO4	Interpret biochemical laboratory and clinical data effectively.	Cognitive	Analyze

CO5	Demonstrate understanding of molecular and cellular biochemistry.	Cognitive	Apply, Create
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Learning Resources	
1.	Textbooks 1. Fundamentals of Biochemistry – A.C. Deb 2. Lehninger Principles of Biochemistry 3. Harper’s Illustrated Biochemistry 4. Biochemistry – Satyanarayana 5. Textbook of Biochemistry 6. Medical Biochemistry 7. Pharmaceutical Biology – Kokate
2.	Reference Books 1. Molecular Biology of the Cell 2. Enzymology Manuals 3. Clinical Biochemistry 4. Metabolism and Nutrition 5. Biochemical Techniques

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20marks	
Theory: End Semester Marks	40marks	
Theory: Continuous Evaluation Component Marks	Attendance	10marks
	MCQs	10marks
	Skill enhancement activities/case study	10marks
	Presentation/ miscellaneous activities	10marks



	Total	40 Marks
Practical Marks	Attendance	05 marks
	Practical Exam	20 marks
	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	1	-	-	1
CO2	3	2	2	1	-	1
CO3	3	3	2	1	1	2
CO4	2	3	2	2	1	2
CO5	2	3	3	2	2	3

Mapping of Pos & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	1	-	-	-	-
CO2	3	2	1	-	-	-
CO3	3	2	2	1	-	1
CO4	2	3	2	1	1	1
CO5	2	3	3	2	1	2

1:Slight(low);2:Moderate(Medium);3:Substantial(High);-None

COURSE CODE BMP0203	COURSE NAME PHARMACEUTICAL LABORATORY – I	SEMESTER II
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
0	60	0	60	0	2	0	2

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Mandatory Course
Course focus	To develop practical laboratory skills in pharmaceutical chemistry and analysis.
Rationale	To develop foundational pharmaceutical laboratory skills and analytical competency.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand basic pharmaceutical laboratory operations and safety practices. CO2. Perform weighing, volumetric and solution preparation techniques accurately. CO3. Apply analytical laboratory methods and pharmaceutical handling procedures. CO4. Develop skills in laboratory documentation, calibration and instrument handling. CO5. Demonstrate good laboratory practices, teamwork and scientific reporting skills.

	Practical	Weightage	Contact
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			hours
	Appropriate laboratory experiments, demonstrations, and skill-based exercises related to the course contents shall be conducted to reinforce theoretical concepts and develop professional competencies.	100%	60

Instructional Method and Pedagogy:

Practical-oriented learning through laboratory experiments, demonstrations and hands-on training.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Perform basic pharmaceutical laboratory operations safely and accurately.	Cognitive	Understand
CO2	Apply analytical and formulation techniques in laboratory practices.	Cognitive	Apply
CO3	Analyze pharmaceutical preparations and experimental observations.	Cognitive	Analyze
CO4	Interpret laboratory data and prepare scientific reports effectively.	Cognitive	Analyze
CO5	Demonstrate good laboratory practices and teamwork skills.	Cognitive	Apply, Create

Learning Resources

1.	Textbooks 1. Practical Pharmaceutical Chemistry 2. Vogel's Textbook of Practical Organic Chemistry 3. Practical Biochemistry 4. Pharmaceutical Analysis
2.	Reference Books 1. Theory and Practice of Industrial Pharmacy 2. Textbook of Pharmaceutical Analysis 3. Instrumental Methods of Chemical Analysis 4. Quality Assurance in Pharmaceutical Industry 5. Practical Manual for Pharmaceutical Chemistry 6. Beckett & Stenlake

Evaluation Scheme		Total Marks
Practical Marks	Attendance	05 marks
	Practical Exam	20 marks
	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	1	-	1	-
CO2	2	3	2	1	1	1
CO3	2	3	3	1	1	1
CO4	2	2	3	2	2	2
CO5	2	2	3	3	2	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	3	1	-	1	-
CO2	2	3	2	1	1	1
CO3	2	3	3	1	1	1
CO4	2	2	3	2	2	2
CO5	2	2	3	3	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0204	COURSE NAME PHARMACEUTICAL LABORATORY – II	SEMESTER II
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
0	60	0	60	0	2	0	2

Course Pre-requisites	Students should have cleared 12 th Science
Course Category	Mandatory Course
Course focus	To develop analytical and pharmaceutical laboratory Competencies.
Rationale	develop foundational pharmaceutical laboratory skills and analytical competency.
Course Revision/ Approval Date:	22/05/2026

Course Objectives	After completion of the course, students will be able to
	CO1. Understand pharmaceutical analytical techniques and laboratory procedures. CO2. Perform preparation and evaluation of basic pharmaceutical dosage forms. CO3. Apply chromatographic, spectroscopic and microscopy techniques in pharmaceutical analysis. CO4. Develop skills in laboratory calculations, documentation and record maintenance. CO5. Demonstrate laboratory safety, sterility handling and professional laboratory ethics.

	Practical	Weightage	Contact hours
	Appropriate laboratory experiments, demonstrations, and skill-based exercises related to the course contents shall be conducted to reinforce theoretical concepts and develop professional competencies.	100%	60

Instructional Method and Pedagogy:

Experimental learning through laboratory practices, analytical exercises and record maintenance.

Course Outcome:	Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:		

CO1	Perform pharmaceutical and biochemical laboratory experiments effectively.	Cognitive	Understand
CO2	Apply laboratory analytical techniques for pharmaceutical testing.	Cognitive	Apply
CO3	Analyze pharmaceutical samples using standard methods.	Cognitive	Analyze
CO4	Interpret experimental results and scientific observations accurately.	Cognitive	Analyze
CO5	Demonstrate laboratory safety, ethics and professional skills.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Practical Pharmaceutical Chemistry 2. Pharmaceutical Analysis 3. Practical Biochemistry 4. Textbook of Pharmaceutics 5. Vogel's Textbook of Practical Organic Chemistry
2.	Reference Books 1. Theory and Practice of Industrial Pharmacy 2. Instrumental Methods of Chemical Analysis 3. Textbook of Pharmaceutical Analysis 4. Remington: The Science and Practice of Pharmacy 5. Practical Manual of Pharmaceutical Chemistry

Evaluation Scheme		Total Marks
Practical Marks	Attendance	05 marks
	Practical Exam	20 marks

	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	1	-	1	-
CO2	2	3	2	1	1	1
CO3	2	3	3	1	1	1
CO4	2	2	3	2	2	2
CO5	2	2	3	3	2	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	3	1	-	1	-
CO2	2	3	2	1	1	1
CO3	2	3	3	1	1	1
CO4	2	2	3	2	2	2
CO5	2	2	3	3	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0205	COURSE NAME STATISTICS BASICS	SEMESTER II
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
45	30	0	75	3	1	0	4

Course Pre-requisites	Student should have cleared 12th Science		
Course Category	Mandatory Course		
Course focus	To understand statistical methods and data interpretation in pharmaceutical sciences.		
Rationale	his course develops statistical and biostatistical skills essential for pharmaceutical analysis, research, quality control, clinical studies and healthcare data interpretation.		
Course Revision/ Approval Date:	22/05/2026		
Course Objectives	After completion of the course, students will be able to: CO1. Understand basic statistical and biostatistical concepts used in pharmaceutical sciences. CO2. Explain methods of data collection, classification and graphical representation. CO3. Analyze pharmaceutical and healthcare data using statistical tools. CO4. Interpret statistical significance, correlation and regression analysis. CO5. Apply statistical methods in pharmaceutical quality control, analytical validation and research studies.		
Course Content (Theory)		Weightage	Contact hours



Unit I: Introduction to Statistics and Biostatistics Nature and scope of statistics, biostatistics, data collection methods, sampling techniques, classification and tabulation of data, frequency distribution, graphical representation, histogram, pie chart and pharmaceutical applications	20%	9
Unit II: Measures of Central Tendency and Dispersion Mean, median, mode, geometric mean, harmonic mean, standard deviation, variance, coefficient of variation, skewness and kurtosis, statistical interpretation in pharmaceutical analysis	20%	9
Unit III: Probability and Distributions Basic probability concepts, addition and multiplication laws, binomial distribution, Poisson distribution, normal distribution, applications in pharmaceutical quality control and biological studies	20%	9
Unit IV: Correlation, Regression and Hypothesis Testing Correlation coefficient, regression analysis, t-test, chi-square test, ANOVA basics, statistical significance, confidence intervals, pharmaceutical and clinical data interpretation	20%	9
Unit V Statistical quality control, calibration curve analysis, analytical validation statistics, bioavailability data interpretation, design of experiments, statistical software applications in pharmaceutical sciences	20%	9

	Practical	Weightage	Contact hours
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Appropriate laboratory experiments, demonstrations, and skill-based exercises related to the course contents shall be conducted to reinforce theoretical concepts and develop professional competencies.	100%	30
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Instructional Method and Pedagogy:

Teaching through lectures, numerical problem-solving and software-based statistical analysis.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain basic statistical and biostatistical concepts used in pharmaceutical sciences.	Cognitive	Understand
CO2	Apply methods of data collection, classification and graphical representation for pharmaceutical datasets.	Cognitive	Apply
CO3	Analyze pharmaceutical and healthcare data using statistical and biostatistical tools effectively.	Cognitive	Analyze
CO4	Interpret statistical significance, correlation, regression and analytical results accurately.	Cognitive	Analyze
CO5	Demonstrate application of statistical methods in pharmaceutical quality control,	Cognitive	Apply, Create



	analytical validation and research studies.		
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Learning Resources	
1.	Textbooks 1. Pharmaceutical Statistics – Bolton & Bon 2. Fundamentals of Biostatistics 3. Biostatistics 4. Statistical Methods 5. Statistics for Pharmacy Students 6. Basic Statistics and Pharmaceutical Statistical Applications
2.	Reference Books 1. Practical Statistics for Medical Research 2. Pharmaceutical Statistics 3. Research Methodology and Biostatistics 4. Introduction to Biostatistics 5. Applied Statistics in Pharmaceutical Sciences

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks
Practical Marks	Attendance	05 marks
	Practical Exam	20 marks



	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks

Mapping of PSOs & COs

Cos \ PSOs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	1	0	0	1
CO2	3	2	2	1	0	2
CO3	2	3	2	1	1	2
CO4	2	3	2	2	1	2
CO5	2	2	3	2	2	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	1	1	0	0	1
CO2	3	2	2	1	0	2
CO3	2	3	3	1	1	2
CO4	2	3	3	2	1	2
CO5	2	1	2	2	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0206				COURSE NAME INTERNSHIP – I (LABORATORY SAFETY & PRACTICES)				SEMESTER II			
Teaching Scheme (Hours)				Teaching Credit							
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit				
0	60	0	60	0	2	0	2				

Course Category	Mandatory Course
Course focus	To provide practical exposure to analytical and industrial laboratory practices.
Rationale	This course provides industrial exposure and hands-on training in basic analytical and laboratory practices.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand analytical laboratory operations. CO2. Explain laboratory safety and SOPs. CO3. Apply analytical instrumentation techniques. CO4. Analyze pharmaceutical samples. CO5. 5. Develop industrial laboratory skills.

	Practical	Weightage	Contact hours
	Appropriate laboratory experiments, demonstrations, and skill-based exercises related to the course contents shall be conducted to reinforce theoretical concepts	100%	60

	and develop professional competencies.		
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Instructional Method and Pedagogy:

Experiential learning through industrial visits, internships and practical laboratory training.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Perform analytical laboratory operations following SOPs and safety practices.	Cognitive	Understand
CO2	Apply basic analytical instrumentation techniques in pharmaceutical laboratories.	Cognitive	Apply
CO3	Analyze pharmaceutical samples and laboratory observations effectively.	Cognitive	Analyze
CO4	Interpret analytical data and industrial documentation procedures accurately.	Cognitive	Analyze
CO5	Demonstrate professional laboratory ethics and practical analytical skills.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Laboratory Safety Manual

	2. Analytical Instrumentation Basics 3. Pharmaceutical QC Procedures 4. Practical Pharmaceutical Analysis 5. Industrial Laboratory Practices
2.	Reference Books 1. GLP and GMP Guidelines 2. Laboratory Documentation Manuals 3. Instrument Calibration Manuals 4. WHO Laboratory Standards 5. Industrial Training Manuals

Evaluation Scheme	Total Marks	
Project/ Industrial Internship Marks	Quantity of the Project/Industrial in terms of Language, Presentation & format.	40 marks
	Practical understanding of the subject on the Project/Industrial	20 marks
	Industry/ University mentor's feedback on the Project/ Industrial.	20 marks
	Attendance	20 marks
	Total	100 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
C01	2	3	1	-	1	-
C02	2	3	2	1	1	1
C03	2	3	3	1	1	1
C04	2	2	3	2	2	2
C05	2	2	3	3	2	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
C01	2	3	1	-	1	-
C02	2	3	2	1	1	1
C03	2	3	3	1	1	1
C04	2	2	3	2	2	2
C05	2	2	3	3	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None



Teaching Scheme Semester – III

Semester – III							
Sr. No.	Course Code	Course Title	L	T	P	C	Marks
A. Ability Enhancement Compulsory Course							
1	AECC301	Environmental Science	2	0	0	2	100
B. Value Added Course							
2	SECC301	Leadership & Teambuilding Skills	2	0	0	2	100
C. Major Course							
3	BMP0301	Physical Pharmaceutics	2	0	1	3	150
4	BMP0302	Pharmacognosy	3	0	0	3	100
5	BMP0303	Pharmaceutical Microbiology	2	0	1	3	150
6	BMP0304	Pharmaceutical Analysis – I	0	0	2	2	50
7	BMP0305	Pharmaceutical Analysis – II	0	0	2	2	50
D. Minor Course							
8	BMP0306	Entrepreneurship Basics	4	0	0	4	100
E. Skill Enhancement Course							
9	BMP0307	Internship - II (Basic Analytical Skills)	0	0	2	2	100
F. Interdisciplinary Course							
10	BMP0308	AI and Data Science in Healthcare	2	0	1	3	150
Total						24	1050

COURSE CODE AECC301	COURSE NAME ENVIRONMENTAL SCIENCE	SEMESTER III
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
30	00	00	30	2	00	00	2

Course Pre-requisites	10 +2 with Science
Course Category	Ability Enhancement Compulsory Course.
Course focus	To develop awareness regarding environmental sustainability and ecological balance.
Rationale	The fundamental concepts of environmental studies help in understanding the ecosystem and biogeochemical cycle that connects humans with their biosphere. Moreover, understanding pollution & treatment to treat a variety of pollution will enhance problem-solving skills of the students.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to CO1.Remember: To acquire an awareness of and sensitivity to the total environment and its allied problems. CO2.Understand: To make educated judgments about environmental issues. CO3.Apply: Develop skills and a commitment to act independently and collectively to environmental sustainability

	CO4.Analyse: Students can able to debate environmental science with use of appropriate scientific information		
	CO5.Create: Engaging with students of all disciplines to think critically, ethically, and creatively when evaluating environmental issues.		
Course Content (Theory)		Weightage	Contact hours
Unit 1: Introduction of Ecology Ecology-Objectives and Classification Concepts of an ecosystem-structure & function of ecosystem components of ecosystem, Hydrological cycle, carbon cycle, oxygen cycle, Nitrogen cycle, Sulphur cycle.		20%	6
Unit 2: Unit 2: Ecological pyramids of various ecosystems Forest Ecosystem, Grassland Ecosystem, Desert Ecosystem, Aquatic ecosystem, Estuarine Ecosystem.		20%	6
Unit 3: Air pollution and its control Introduction, Classification of air pollutants, air pollutants and their effects, acid rain, photochemical smog, particulates. Characteristics and biochemical effects of some important air pollutants, Effect of air pollutants on man and environment, Air quality standard, air monitoring and control of air pollution		20%	6
Unit 4: Water pollution and its control Introduction, Classification of water pollutants, physical, chemical and biological characteristics of waste water, waste water treatment: Primary treatment-		20%	6



Sedimentation, coagulation, equalization, neutralization, secondary treatment-aerobic treatment-aerated lagoons, trickling filter, activated sludge process, oxidation ditch process, oxidation pond, anaerobic treatment-anaerobic sludge digestion, sludge treatment and disposal and tertiary treatment-evaporation, ion exchange, adsorption, chemical precipitation, Electrodialysis, reverse osmosis.		
Unit 5: Solid and hazardous waste: pollution, treatment and disposal Introduction, Classification and origin, characteristics of solid wastes, objectives and considerations in solid waste management, methods of solid waste treatment and disposal - composting, land filling, thermal processes-incineration, pyrolysis, recycling and reuse of solid waste-co-disposal, bioconversion.	20%	6

Instructional Method and Pedagogy:

Utilizing models, PowerPoint Presentations, group discussions, and seminars are some of the methods adopted to improve the student's ability to grasp the principles of environmental studies

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1:	Skills for identifying environmental problems: Evaluate information from popular electronic and print media	Understand, Analyze, Remember	Define, Classify & Demonstrate

CO2:	Interdisciplinary - When encountering environmental problems students will assess necessary scientific concepts and data, consider likely social dynamics, and establish integral cultural contexts	Analyze, Apply, Understand	Define, Classify, Describe, Demonstrate & Examine
CO3:	Communication - Students will communicate with precision, effective art, and sound rhetoric in writing, in speech, and in digital media	Understand, remember	Define, Describe & Demonstrate
CO4:	Research - When faced with questions that lie beyond their current knowledge base, students will actively research data, concepts, histories, and narratives necessary for adequate consideration of the issue.	Understand	Define, Classify, Describe, Demonstrate & Examine
CO5:	Intellectual Flexibility - Students will possess the intellectual flexibility necessary to view environmental questions from multiple perspectives, prepared to alter their understanding as they learn new ways of understanding.	Remember, Analyse & Apply	Define, Describe & Demonstrate

Learning Resources	
1.	Reference/Text Books: 1. Fundamentals of Ecology by EP Odum Cengage 2. Big Questions in Ecology & Evolution by TN Sherratt & DM Wilkinson, Oxford. 3. Ecology: Experimental Analysis of Distribution & Abundance by CJ Krebs, Pearson Education, London

	4. Concept of Ecology by EJ Kormondy, Pearson Education, London 5. Conservation Biology: Voices from the Tropics. Bys Sodhi, N.S., Gibson, L. & Raven, P.H. (eds) John Wiley & Sons 6. Plastic and Environment by RE Hester and RM Harrison, Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, CB4 0WF, UK 7. Fundamental concepts in Environmental studies by DD Mishra, S. Chand Publishing, India 8. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology by PS Verma and VK Agarwal, S. Chand Publication, India 9. Fundamentals of Ecology by PD Sharma, Rastogi Publications
2.	Journals & Periodicals: 1. Environmental Pollutants and Bioavailability 2. Clean Air Journal 3. Emerging Contaminants 4. Environment: Science and Policy for Sustainable Development 5. Annual Review of Environment and Resources 6. Renewable Energy 7. Renewable & Sustainable Energy Reviews
3.	Other Electronic Resources: 1. Green.tv—supported by UNEP—broadband TV channel for films about environmental issues. 2. Climate Change TV—funded by companies, governments and organisations, and produced by the magazine Responding to Climate Change—the world's first web channel specific to climate change videos. 3. Terra: The Nature of Our World video podcast produced in conjunction with the Master of Fine Arts program in Science & Natural History Filmmaking at Montana State University, Filmmakers for Conservation, and PBS—weekly video show about science and natural history.

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	-	1	-	3	-	-
CO2	-	3	-	3	-	1
CO3	-	2	-	3	-	-
CO4	-	2	-	3	-	-
CO5	-	2	-	3	-	1

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	-	-	-	2	3	1
CO2	-	1	1	2	3	1
CO3	-	1	-	2	3	3

CO4	-	-	-	2	3	3
CO5	-	-	-	2	3	1

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE SECC301	COURSE NAME LEADERSHIP & TEAMBUILDING SKILLS	SEMESTER III
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
30	00	00	30	2	00	00	2

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Mandatory Course
Course focus	To enhance leadership, teamwork and professional interpersonal skills.
Rationale	This course enhances leadership qualities, interpersonal communication, teamwork, and professional ethics required in multidisciplinary pharmaceutical environments.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Develop leadership and managerial skills. CO2. Improve teamwork and collaboration. CO3. Understand organizational behavior.

	CO4. Enhance professional communication skills.	
	CO5. Develop decision-making and motivational abilities.	
Course Content (Theory)	Weightage	Contact hours
Unit I: Leadership Fundamentals Leadership concepts, leadership styles, qualities of leaders	20%	6
Unit II: Team Building Team dynamics, collaboration, conflict management, coordination	20%	6
Unit III: Communication and Motivation Professional communication, motivation theories, interpersonal skills	20%	6
Unit IV: Decision Making and Ethics Decision-making strategies, ethical leadership, problem-solving	20%	6
Unit V: Professional Development Time management, stress management, workplace behavior	20%	6

Instructional Method and Pedagogy:

Teaching through workshops, role-play, group activities and interactive learning methods.

Course Outcome:	Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:		

CO1	Explain physicochemical principles involved in pharmaceutical dosage forms.	Cognitive	Understand
CO2	Apply pharmaceutical calculations and formulation concepts effectively.	Cognitive	Apply
CO3	Analyze rheology, solubility and stability parameters scientifically.	Cognitive	Analyze
CO4	Interpret physicochemical data related to drug delivery systems.	Cognitive	Analyze
CO5	Demonstrate understanding of pharmaceutical formulation development principles.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Organizational Behaviour 2. Leadership: Theory and Practice 3. Business Communication 4. Soft Skills 5. Personality Development and Soft Skills
2.	Reference Books 1. The 7 Habits of Highly Effective People 2. Team of Teams 3. Developing the Leader Within You 4. Emotional Intelligence 5. Effective Technical Communication

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	1	-	-	-
CO2	3	2	2	-	-	1
CO3	2	3	3	1	1	1
CO4	2	2	3	1	1	2
CO5	2	2	3	2	2	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	1	1	-	-	-
CO2	3	2	2	-	-	1
CO3	2	3	3	1	1	1
CO4	2	2	3	1	1	2
CO5	2	2	3	2	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0301				COURSE NAME PHYSICAL PHARMACEUTICS		SEMESTER III	
Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
30	30	0	60	2	1	0	3

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Mandatory Course
Course focus	To understand physicochemical principles involved in pharmaceutical dosage forms.
Rationale	This course provides understanding of physicochemical principles involved in formulation development, drug stability, and pharmaceutical dosage systems.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand physicochemical principles in pharmaceuticals. CO2. Explain rheology and surface phenomena. CO3. Analyze stability and solubility of dosage forms. CO4. Apply pharmaceutical calculations and kinetics.

	CO5. Develop formulation-related problem-solving skills.		
Course Content (Theory)		Weightage	Contact hours
Unit I: States of Matter and Properties Solid state, liquid state, gaseous state, crystal systems, polymorphism		20%	6
Unit II: Surface and Interfacial Phenomena Surface tension, adsorption, surfactants, wetting agents		20%	6
Unit III: Rheology and Micromeritics Viscosity, flow properties, particle size analysis, density		20%	6
Unit IV: Solutions and Disperse Systems Solubility, buffers, suspensions, emulsions, colloids		20%	6
Unit V: Drug Stability and Kinetics Reaction kinetics, stability testing, degradation pathways		20%	6

	Practical	Weightage	Contact hours
	Appropriate laboratory experiments, demonstrations, and skill-based exercises related to the course contents shall be conducted to reinforce theoretical concepts and develop professional competencies.	100%	30

Instructional Method and Pedagogy:

Teaching through lectures, tutorials, demonstrations and formulation-based discussions.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain physicochemical properties of pharmaceutical systems.	Cognitive	Understand
CO2	Analyze surface and interfacial phenomena in formulations.	Cognitive	Apply
CO3	Interpret rheological and micromeritic properties of dosage forms.	Cognitive	Analyze
CO4	Explain disperse systems and pharmaceutical solutions.	Cognitive	Analyze
CO5	Apply stability and kinetic principles in pharmaceutical formulations.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Physical Pharmaceutics – Martin 2. Aulton's Pharmaceutics 3. Remington: The Science and Practice of Pharmacy 4. Modern Pharmaceutics 5. Pharmaceutics – Lachman and Lieberman 6. Essentials of Physical Pharmacy – Subrahmanyam
2.	Reference Books 1. Pharmaceutical Dosage Forms 2. Physical Pharmacy Principles



	3. Colloidal Chemistry in Pharmacy 4. Pharmaceutical Technology Manuals 5. Drug Delivery Systems 6. Laboratory Manual of Physical Pharmaceutics
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Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks
Practical Marks	Attendance	05 marks
	Practical Exam	20 marks
	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks
Project/ Industrial Internship Marks	Quantity of the Project/Industrial in terms of Language, Presentation & format.	20 marks
	Practical understanding of the subject on the Project/Industrial	10 marks
	Industry/ University mentor's feedback on the Project/ Industrial.	10 marks
	Attendance	10 marks

	Total	50 Marks
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Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	1	-	-	-
CO2	3	2	2	-	-	1
CO3	2	3	3	1	1	1
CO4	2	2	3	1	1	2
CO5	2	2	3	2	2	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	1	1	-	-	-
CO2	3	2	2	-	-	1
CO3	2	3	3	1	1	1
CO4	2	2	3	1	1	2
CO5	2	2	3	2	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0302	COURSE NAME PHARMACOGNOSY	SEMESTER III
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
45	0	0	45	3	0	0	3

Course Pre-requisites	Student should have cleared 12th Science		
Course Category	Mandatory Course		
Course focus	To study medicinal plants, natural products and herbal pharmaceutical systems.		
Rationale	This course imparts knowledge of medicinal plants, natural products, and herbal drugs used in traditional and modern pharmaceutical sciences.		
Course Revision/ Approval Date:	22/05/2026		
Course Objectives	After completion of the course, students will be able to:		
	CO1. Understand medicinal plants and natural products. CO2. Explain phytochemical constituents and extraction methods. CO3. Analyze herbal formulations and adulteration. CO4. Interpret pharmacological importance of crude drugs. CO5. Apply pharmacognostic techniques in pharmaceuticals.		
Course Content (Theory)		Weightage	Contact hours
Unit I: Introduction to Pharmacognosy Scope, history, classification of crude drugs, cultivation methods		20%	9
Unit II: Plant Morphology and Microscopy Plant tissues, microscopy techniques, powder analysis		20%	9
Unit III: Natural Products Alkaloids, glycosides, tannins, volatile oils, resins		20%	9

Unit IV: Herbal Drugs and Nutraceuticals Herbal formulations, nutraceuticals, traditional medicines	20%	9
Unit V: Quality Control and Standardization Adulteration, standardization, WHO guidelines, quality evaluation	20%	9

Instructional Method and Pedagogy:

Teaching through lectures, herbarium studies, specimen observation and practical demonstrations.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain physicochemical properties of pharmaceutical systems.	Cognitive	Understand
CO2	Analyze surface and interfacial phenomena in formulations.	Cognitive	Apply
CO3	Interpret rheological and micromeritic properties of dosage forms.	Cognitive	Analyze
CO4	Explain disperse systems and pharmaceutical solutions.	Cognitive	Analyze
CO5	Apply stability and kinetic principles in pharmaceutical formulations.	Cognitive	Apply, Create

Learning Resources

1.	Textbooks 1. Pharmacognosy – Kokate 2. Textbook of Pharmacognosy – Trease and Evans 3. Medicinal Plants and Herbal Drugs 4. Herbal Drug Technology 5. Pharmacognosy and Phytochemistry
2.	Reference Books 1. Indian Herbal Pharmacopoeia 2. WHO Guidelines on Herbal Medicines 3. Herbal Medicine and Toxicology 4. Plant Biotechnology Manuals 5. Phytochemical Methods

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	1	-	-	1

CO2	3	2	2	-	-	1
CO3	2	3	3	1	1	2
CO4	2	2	3	1	1	2
CO5	2	2	3	2	2	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	1	1	-	-	1
CO2	3	2	2	-	-	1
CO3	2	3	3	1	1	2
CO4	2	2	3	1	1	2
CO5	2	2	3	2	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0303	COURSE NAME PHARMACEUTICAL MICROBIOLOGY	SEMESTER III
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
30	30	0	60	2	1	0	3

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Mandatory Course
Course focus	To understand microorganisms and microbiological

	applications in pharmaceuticals.		
Rationale	This course explains microorganisms, sterilization, contamination control, and microbiological applications in pharmaceutical manufacturing and healthcare.		
Course Revision/ Approval Date:	22/05/2026		
Course Objectives	After completion of the course, students will be able to: CO1. Understand microbial classification and growth. CO2. Explain sterilization and aseptic techniques. CO3. Analyze microbial contamination and control. CO4. Interpret immunological and infectious processes. CO5. Apply microbiological techniques in pharmaceutical industries.		
Course Content (Theory)		Weightage	Contact hours
Unit I: Introduction to Microbiology Classification of microorganisms, bacterial cell structure, microbial growth		20%	9
Unit II: Sterilization and Disinfection Sterilization methods, disinfectants, aseptic techniques		20%	9
Unit III: Microbial Genetics and Immunology Genetics, mutations, immune response, vaccines		20%	9
Unit IV: Pharmaceutical Microbiology Sterility testing, microbial contamination, clean room concepts		20%	9
Unit V: Industrial and Medical Microbiology Fermentation technology, antibiotics production,		20%	9

pathogenic microorganisms		
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	Practical	Weightage	Contact hours
	Appropriate laboratory experiments, demonstrations, and skill-based exercises related to the course contents shall be conducted to reinforce theoretical concepts and develop professional competencies.	100%	30

Instructional Method and Pedagogy:

Teaching through lectures, microbiological experiments and aseptic laboratory practices.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain microbial classification, growth and control methods.	Cognitive	Understand
CO2	Apply aseptic techniques and sterilization methods in laboratories.	Cognitive	Apply
CO3	Analyze microbial contamination and pharmaceutical microbiology practices.	Cognitive	Analyze
CO4	Interpret microbiological test results and quality standards effectively.	Cognitive	Analyze

CO5	Demonstrate laboratory skills related to pharmaceutical microbiology.	Cognitive	Apply, Create
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Learning Resources	
1.	Textbooks 1. Pharmaceutical Microbiology – Hugo and Russell 2. Prescott's Microbiology 3. Medical Microbiology 4. Microbiology – Pelczar 5. Industrial Microbiology
2.	Reference Books 1. WHO Sterility Guidelines 2. Bergey's Manual of Bacteriology 3. Sterilization and Disinfection Techniques 4. Biotechnology and Fermentation Technology 5. Immunology Basics 6. Applied Pharmaceutical Microbiology

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks
Practical Marks	Attendance	05 marks



	Practical Exam	20 marks
	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks
Project/ Industrial Internship Marks	Quantity of the Project/Industrial in terms of Language, Presentation & format.	20 marks
	Practical understanding of the subject on the Project/Industrial	10 marks
	Industry/ University mentor's feedback on the Project/ Industrial.	10 marks
	Attendance	10 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	1	-	1	-
CO2	3	2	2	-	1	1
CO3	2	3	3	1	1	1
CO4	2	3	2	1	2	2
CO5	2	2	3	2	2	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
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CO1	3	1	1	-	1	-
CO2	3	2	2	-	1	1
CO3	2	3	3	1	1	1
CO4	2	3	2	1	2	2
CO5	2	2	3	2	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0304	COURSE NAME PHARMACEUTICAL ANALYSIS - I	SEMESTER III
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
0	60	0	60	0	2	0	2

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Mandatory Course
Course focus	To develop analytical skills for pharmaceutical testing and quality control.
Rationale	This course introduces analytical methods and quantitative techniques essential for drug analysis and quality control.
Course Revision/ Approval Date:	22/05/2026
	After completion of the course, students will be able to:

Course Objectives	CO1. Understand pharmaceutical analytical techniques. CO2. Explain titrimetric and instrumental methods. CO3. Analyze pharmaceutical compounds quantitatively. CO4. Interpret analytical data and calibration methods. CO5. Apply analytical procedures in quality control.

	Practical	Weightage	Contact hours
	Appropriate laboratory experiments, demonstrations, and skill-based exercises related to the course contents shall be conducted to reinforce theoretical concepts and develop professional competencies.	100%	60

Instructional Method and Pedagogy:

Teaching through laboratory experimentation, analytical demonstrations and instrumental training.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain pharmaceutical analytical methods and principles.	Cognitive	Understand

CO2	Apply titrimetric and instrumental analytical techniques effectively.	Cognitive	Apply
CO3	Analyze pharmaceutical compounds quantitatively and qualitatively.	Cognitive	Analyze
CO4	Interpret analytical results and validation parameters accurately.	Cognitive	Analyze
CO5	Demonstrate analytical competencies in pharmaceutical quality control.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Instrumental Methods of Analysis 2. Pharmaceutical Analysis – Beckett and Stenlake 3. Vogel's Quantitative Analysis 4. Analytical Chemistry – Skoog 5. Spectroscopy in Pharmaceutical Analysis 6. Pharmaceutical Analysis – Chatwal & Anand
2.	Reference Books 1. HPLC and Chromatography Manuals 2. Indian Pharmacopoeia 3. USP Guidelines 4. Analytical Validation Methods 5. Journal of Pharmaceutical Analysis 6. WHO Sterility Guidelines

Evaluation Scheme	Total Marks
Theory: Mid semester Marks	20 marks



Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	20 Marks
Practical Marks	Attendance	05 marks
	Practical Exam	20 marks
	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks
Project/ Industrial Internship Marks	Quantity of the Project/Industrial in terms of Language, Presentation & format.	20 marks
	Practical understanding of the subject on the Project/Industrial	10 marks
	Industry/ University mentor's feedback on the Project/ Industrial.	10 marks
	Attendance	10 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
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CO1	3	2	1	-	-	-
CO2	3	3	2	1	-	-
CO3	2	3	3	1	1	1
CO4	2	3	3	2	2	1
CO5	2	3	3	2	2	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	2	1	-	-	-
CO2	3	3	2	1	-	-
CO3	2	3	3	1	1	1
CO4	2	3	3	2	2	1
CO5	2	3	3	2	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0305	COURSE NAME PHARMACEUTICAL ANALYSIS - II	SEMESTER III
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
0	60	0	60	0	2	0	2

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Mandatory Course
Course focus	To understand advanced pharmaceutical analytical

	methods and instrumentation.
Rationale	This course develops practical analytical skills for pharmaceutical testing, standardization, and instrumental analysis.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand advanced analytical instrumentation. CO2. Explain chromatographic and spectroscopic methods. CO3. Analyze pharmaceutical samples using instruments. CO4. Interpret analytical validation procedures. CO5. Apply analytical techniques in industries and research.

	Practical	Weightage	Contact hours
	Appropriate laboratory experiments, demonstrations, and skill-based exercises related to the course contents shall be conducted to reinforce theoretical concepts and develop professional competencies.	100%	60

Instructional Method and Pedagogy:

Teaching through practical sessions, analytical exercises and instrument handling training.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain advanced analytical and instrumental techniques.	Cognitive	Understand
CO2	Apply chromatographic and spectroscopic methods in pharmaceutical analysis.	Cognitive	Apply
CO3	Analyze pharmaceutical samples using analytical instrumentation.	Cognitive	Analyze
CO4	Interpret analytical data and quality control parameters effectively.	Cognitive	Analyze
CO5	Demonstrate practical analytical and instrumentation skills.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Instrumental Analysis – Skoog 2. Pharmaceutical Analysis – Chatwal and Anand 3. Modern Analytical Chemistry 4. Pharmaceutical Instrumentation 5. Spectroscopic Methods in Analysis
2.	Reference Books 1. Chromatography Principles 2. Analytical Method Validation 3. Pharmaceutical QC Manuals 4. WHO Analytical Guidelines 5. Analytical Chemistry Research Papers

	6. Indian Pharmacopoeia
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Evaluation Scheme		Total Marks
Practical Marks	Attendance	05 marks
	Practical Exam	20 marks
	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	1	-	-	-
CO2	3	3	2	1	-	-
CO3	2	3	3	1	1	1
CO4	2	3	3	2	2	1
CO5	2	3	3	2	2	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	2	1	-	-	-
CO2	3	3	2	1	-	-
CO3	2	3	3	1	1	1
CO4	2	3	3	2	2	1
CO5	2	3	3	2	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0306	COURSE NAME ENTREPRENEURSHIP BASICS	SEMESTER III
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
60	0	0	60	4	0	0	4

Course Pre-requisites	Student should have cleared 12th Science		
Course Category	Mandatory Course		
Course focus	To develop entrepreneurial mindset and innovation skills in pharmaceutical sectors.		
Rationale	This course develops entrepreneurial mindset, innovation skills, and business understanding for pharmaceutical startups and industries.		
Course Revision/ Approval Date:	22/05/2026		
Course Objectives	After completion of the course, students will be able to: CO1. Understand entrepreneurship concepts. CO2. Explain startup and business planning. CO3. Analyze innovation and risk management. CO4. Interpret industrial and financial systems. CO5. Develop entrepreneurial competencies.		
Course Content (Theory)		Weightage	Contact hours
Entrepreneurship concepts, Entrepreneurial skills and traits		100	60

Startup ecosystem, Business opportunities in pharmaceuticals, Business planning basics, Innovation and creativity, Marketing fundamentals, financial planning basics, Leadership and communication, Ethics in entrepreneurship		
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Instructional Method and Pedagogy:

Teaching through lectures, business case studies and startup-oriented activities.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain entrepreneurship concepts and business planning strategies.	Cognitive	Understand
CO2	Apply innovation and managerial skills in entrepreneurial activities.	Cognitive	Apply
CO3	Analyze startup opportunities and market systems critically.	Cognitive	Analyze
CO4	Interpret financial and operational business processes effectively.	Cognitive	Analyze
CO5	Demonstrate entrepreneurial and leadership competencies.	Cognitive	Apply, Create

Learning Resources

1.	Textbooks 1. Entrepreneurship Development 2. Principles of Management
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	3. Innovation and Entrepreneurship 4. Small Business Management 5. Entrepreneurship in Healthcare
2.	Reference Books 1. Startup Management 2. Leadership and Innovation 3. Pharmaceutical Entrepreneurship 4. Industrial Management 5. Strategic Entrepreneurship

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks
Practical Marks	Attendance	05 marks
	Practical Exam	20 marks
	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks
Project/ Industrial Internship Marks	Quantity of the Project/Industrial in terms of Language, Presentation & format.	20 marks
	Practical understanding of the	10 marks



	subject on the Project/Industrial	
	Industry/ University mentor's feedback on the Project/ Industrial.	10 marks
	Attendance	10 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	0	1	2	2	1
CO2	1	1	1	2	3	1
CO3	1	1	2	2	3	2
CO4	1	1	2	3	3	2
CO5	1	2	2	3	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	1	0	1	2	2	1
CO2	1	1	1	2	3	1
CO3	1	1	2	2	3	2
CO4	1	1	2	3	3	2
CO5	1	2	2	3	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); 0 None

COURSE CODE BMP0307	COURSE NAME INTERNSHIP – II (BASIC ANALYTICAL SKILLS)	SEMESTER III
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
0	60	0	60	0	2	0	2

Course Category	Mandatory Course
Course focus	To provide practical exposure to analytical and industrial laboratory practices.
Rationale	This course provides industrial exposure and hands-on training in basic analytical and laboratory practices.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand analytical laboratory operations. CO2. Explain laboratory safety and SOPs. CO3. Apply analytical instrumentation techniques. CO4. Analyze pharmaceutical samples. CO5. Develop industrial laboratory skills.

Instructional Method and Pedagogy:

Experiential learning through industrial visits, internships and practical laboratory training.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Perform analytical laboratory operations following SOPs and safety practices.	Cognitive	Understand
CO2	Apply basic analytical instrumentation techniques in pharmaceutical laboratories.	Cognitive	Apply
CO3	Analyze pharmaceutical samples and laboratory observations effectively.	Cognitive	Analyze
CO4	Interpret analytical data and industrial documentation procedures accurately.	Cognitive	Analyze
CO5	Demonstrate professional laboratory ethics and practical analytical skills.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Laboratory Safety Manual 2. Analytical Instrumentation Basics 3. Pharmaceutical QC Procedures 4. Practical Pharmaceutical Analysis 5. Industrial Laboratory Practices
2.	Reference Books 1. GLP and GMP Guidelines 2. Laboratory Documentation Manuals

	3. Instrument Calibration Manuals 4. WHO Laboratory Standards 5. Industrial Training Manuals
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Evaluation Scheme		Total Marks
Project/ Industrial Internship Marks	Quantity of the Project/Industrial in terms of Language, Presentation & format.	40 marks
	Practical understanding of the subject on the Project/Industrial	20 marks
	Industry/ University mentor's feedback on the Project/ Industrial.	20 marks
	Attendance	20 marks
	Total	100 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	1	-	1	-
CO2	2	3	2	1	1	1
CO3	2	3	3	1	1	1
CO4	2	2	3	2	2	2
CO5	2	2	3	3	2	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	3	1	-	1	-
CO2	2	3	2	1	1	1
CO3	2	3	3	1	1	1
CO4	2	2	3	2	2	2
CO5	2	2	3	3	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0308	COURSE NAME AI AND DATA SCIENCE IN HEALTHCARE	SEMESTER III
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
30	30	0	60	2	1	0	3

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Mandatory Course
Course focus	To develop knowledge of artificial intelligence, healthcare analytics and data science applications in pharmaceutical and healthcare systems.
Rationale	This course introduces artificial intelligence and data analytics applications in healthcare, diagnostics, and pharmaceutical research.
Course Revision/	22/05/2026



Approval Date:			
Course Objectives	After completion of the course, students will be able to: CO1. Understand concepts of artificial intelligence, machine learning and data science in healthcare systems. CO2. Explain computational tools, healthcare analytics methods and digital healthcare technologies. CO3. Analyze healthcare datasets and healthcare information systems using analytical techniques. CO4. Interpret bioinformatics data, healthcare analytical outputs and predictive healthcare models. CO5. Develop understanding of AI-based applications in pharmaceutical sciences, diagnostics and healthcare management.		
Course Content (Theory)	Weightage	Contact hours	
Unit I: Introduction to AI and Data Science AI concepts, machine learning basics, healthcare informatics	20%	6	
Unit II: Healthcare Data Management Electronic health records, healthcare databases, data visualization	20%	6	
Unit III: Machine Learning Applications Predictive analytics, clinical decision support systems, AI algorithms	20%	6	
Unit IV Pharmaceutical Data Science Drug discovery analytics, pharmacovigilance, bioinformatics	20%	6	



Unit V: Future Technologies in Healthcare Precision medicine, wearable devices, telemedicine, ethical AI	20%	6
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	Practical	Weightage	Contact hours
	Appropriate laboratory experiments, demonstrations, and skill-based exercises related to the course contents shall be conducted to reinforce theoretical concepts and develop professional competencies.	100%	30

Instructional Method and Pedagogy:

Teaching through lectures, software demonstrations, case studies and ICT-enabled learning.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain AI, machine learning and data science concepts in healthcare.	Cognitive	Understand
CO2	Apply computational tools and healthcare analytics techniques effectively.	Cognitive	Apply
CO3	Analyze healthcare datasets and digital health information systems.	Cognitive	Analyze
CO4	Interpret bioinformatics and healthcare analytical outputs accurately.	Cognitive	Analyze



CO5	Demonstrate understanding of AI applications in pharmaceutical and healthcare systems.	Cognitive	Apply, Create
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Learning Resources	
1.	Textbooks 1. Artificial Intelligence in Healthcare 2. Data Science Fundamentals 3. Healthcare Informatics 4. Machine Learning Basics 5. Bioinformatics and Data Analytics 6. Bioinformatics – Rastogi
2.	Reference Books 1. Python for Data Science 2. AI Applications in Medicine 3. Big Data Analytics 4. Digital Health Systems 5. Computational Biology

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks



Practical Marks	Attendance	05 marks
	Practical Exam	20 marks
	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks
Project/ Industrial Internship Marks	Quantity of the Project/Industrial in terms of Language, Presentation & format.	20 marks
	Practical understanding of the subject on the Project/Industrial	10 marks
	Industry/ University mentor's feedback on the Project/ Industrial.	10 marks
	Attendance	10 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	1	1	-	-	3
CO2	2	2	2	1	-	3
CO3	2	3	2	1	1	3
CO4	2	3	3	2	1	3
CO5	2	2	3	2	2	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
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C01	2	1	2	-	-	3
C02	2	2	3	1	-	3
C03	2	3	3	1	1	3
C04	2	3	3	2	1	3
C05	2	2	3	2	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None



Teaching Scheme Semester – IV

Semester – IV							
Sr. No.	Course Code	Course Title	L	T	P	C	Marks
A. Ability Enhancement Compulsory Course							
1	AECC401	Disaster Risk Management	2	0	0	2	100
B. Value Added Course							
2	SECC401	Presentation & Placement Skills	1	1	0	2	100
C. Major Course							
3	BMP0401	Medicinal Chemistry – I	3	0	0	3	100
4	BMP0402	Pharmacology – I	3	0	0	3	100
5	BMP0403	Pharmaceutics – I	3	0	0	3	100
6	BMP0404	Pharmaceutical Analysis – II	0	0	2	2	50
7	BMP0405	Analytical Instrumentation	0	0	2	2	50
D. Minor Course							
8	BMP0406	Business Management	4	0	0	4	100
E. Skill Enhancement Course							
9	BMP0407	Patent Review	0	1	1	2	100
F. Interdisciplinary Course							
10	BMP0408	Public Health System	3	0	0	3	100
Total						24	900

COURSE CODE AECC401	COURSE NAME DISASTER RISK MANAGEMENT	SEMESTER IV
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
30	0	0	30	2	0	0	2

Course Pre-requisites	10 +2 with Science
Course Category	Ability enhancement compulsory course.
Course focus	To understand disaster preparedness and emergency response systems.
Rationale	The fundamental concepts of Disaster risk management help in understanding the types of disasters and risk associated with it. Moreover, understanding this subject provides students with proper guidance and a line of action to deal with consequences raised during deadly disasters.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Remember: to introduce inter-relationship between disaster and development. CO2. Apply: to introduce types of disasters with case studies and create awareness.



	CO3. Understand: to study the effective use of science for mitigating disasters		
	CO4. Analyse: to study case studies of various famous disasters.		
	CO5. Apply: to introduce various disaster management frameworks and strategies adopted at national and international levels.		
Course Content (Theory)		Weightage	Contact hours
Unit 1: Theory: Introduction to Disasters-Understanding the Concepts and Definitions of Disaster, Hazard, Vulnerability Risk, Capacity Disaster and Development, and Disaster Management Fundamental of Disasters-Types, Trends, Causes, Consequences and Control: Geological Disasters, Hydro-Meteorological Disasters, Biological Disasters, Technological Disasters, and Man-made Disasters. Global Disaster Trends – Emerging Risks of Disasters – Climate Change and Urban Disasters.		20%	6
Unit 2: Theory: Disaster Management Cycle and Framework-Disaster Management Cycle – Paradigm Shift in Disaster Management, Pre-Disaster – Risk Assessment and Analysis, Risk Mapping, Zonation, Micro zonation, Prevention and Mitigation of Disasters, Early Warning System, Preparedness, Capacity Development; Awareness, During Disaster – Evacuation – Disaster Communication – Search and Rescue, Emergency Operation Centre– Incident Command System – Relief And Rehabilitation. Post		20%	6



-disaster Damage and Needs Assessment, Restoration of Critical Infrastructure – Early Recovery – Reconstruction and Redevelopment; IDNDR, Yokohama Strategy, Hyogo Framework of Action, Sendai framework.		
Unit 3: Disaster Management in India Disaster Profile of India – Mega Disasters of India and Lessons Learnt, Disaster, Management Act 2005 – Institutional and Financial Mechanism, National Policy on Disaster Management, National Guidelines and Plans on Disaster Management; Role of Government (local, state and national), Non-Government and Inter Governmental Agencies. Disaster Management Act in relation to COVID 19 Pandemic.	20%	6
Unit 4: Role of Science and Technology in Disaster Management Geo-informatics in Disaster Management (RS, GIS, GPS and RS), Disaster Communication System (Early Warning and Its Dissemination), Land, Planning and Development Regulations, Disaster Safe Designs and Constructions, Structural and Non-Structural Mitigation of Disasters, S&T Institutions for Disaster in India	20%	6
Unit 5: Disaster Case Studies Various Case Studies on Disaster and Development, Disaster Prevention and Control, Risk Analysis and Management. Case study relating to COVID -19 to be explored.	20%	6

Instructional Method and Pedagogy:

Teaching through lectures, simulations, disaster management case studies and awareness activities.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Possess awareness to mitigate the effects of disaster	Understand	Define, Classify & Describe
CO2	Know local disaster management policies, regulations and authorities.	Apply	Define, Classify, Describe, Demonstrate & Examine
CO3	Contribute in capacity-building measures to mitigate disasters	Analyses and Evaluation	Define, Classify, Describe & Demonstrate
CO4	Understanding role of science in mitigating disasters	Understand	Define, Classify, Describe, Demonstrate & Examine
CO5	Contribute to safe society by the study of various disasters.	Remember & apply	Define, Describe & Demonstrate

Learning Resources	
1.	Reference/Text Books: - Goyal, S.L., Encyclopedia of Disaster Management (Vols. 1-3), Deep & Deep, New Delhi - Gupta, A.K., Nair, S.S., Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi.

	3. Ibrahimbegovic, A., Zlatar, M., Damage Assessment and Reconstruction after War or Natural Disaster, Springer. 4. Menshikov, V.A., Perminov, A.N., Urlichich, Y.M., Global Aerospace Monitoring and Disaster 5. Modh, S., Introduction to Disaster Management, Macmillan Publishers India 6. Alexander, D., Natural Disasters, Kluwer Academic London. 7. Asthana, N. C., Asthana P., Disaster Management, Aavishkar Publishers. 8. Carter, N., Disaster Management: A Disaster Manager's Handbook, Asian Development Bank. 9. Collins, A.E., Disaster and Development, Routledge. 10. Coppola, D.P., Introduction to International Disaster Management, 2nd Edition, Elsevier Science.
2.	Journals & Periodicals: 1. GSDMJ, disaster management act
3.	Other Electronic Resources: GIDM, NIDM

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	-	3	2	-	1	1
CO2	1	1	1	1	1	1
CO3	3	2	3	-	2	2
CO4	2	1	2	1	1	-
CO5	1	-	3	1	-	-

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	-	1	-	2	1	3
CO2	1	1	1	1	1	-
CO3	-	1	1	2	1	-
CO4	-	-	1	3	-	-
CO5	-	-	2	2	1	-

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE SECC401	COURSE NAME PRESENTATION & PLACEMENT SKILLS	SEMESTER IV
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
15	0	15	30	1	0	1	2

Course Pre-requisites	Students should have completed foundational courses of the program.		
Course Category	Value Added Course		
Course focus	To develop communication, presentation, personality development and employability skills required for professional success.		
Rationale	This course enhances professional communication, presentation abilities, interview techniques, and employability skills.		
Course Revision/ Approval Date:	22/05/2026		
Course Objectives	After completion of the course, students will be able to:		
	CO1. Develop professional presentation skills. CO2. Improve interview and placement readiness. CO3. Enhance verbal and non-verbal communication. CO4. Develop confidence and personality skills. CO5. Apply corporate communication strategies.		
Course Content (Theory)		Weightage	Contact hours
Unit I: Communication Skills Verbal communication, non-verbal communication, professional etiquette		20%	3
Unit II: Presentation Techniques Public speaking, presentation tools, scientific presentation skills		20%	3
Unit III: Resume and Interview Skills CV preparation, interview handling, group discussion techniques		20%	3

Unit IV: Personality Development Leadership, confidence building, teamwork, stress management	20%	3
Unit V: Placement Preparation Aptitude preparation, workplace ethics, professional communication	20%	3

Instructional Method and Pedagogy:

Teaching through mock interviews, presentations, communication exercises and soft skill training.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain principles of medicinal chemistry and drug design.	Cognitive	Understand
CO2	Apply structure–activity relationship concepts in drug development.	Cognitive	Apply
CO3	Analyze chemical structures and mechanisms of therapeutic agents.	Cognitive	Analyze
CO4	Interpret synthetic pathways and medicinal applications of drugs.	Cognitive	Analyze
CO5	Demonstrate understanding of medicinal chemistry in pharmaceutical sciences.	Cognitive	Apply, Create



Learning Resources	
1.	Textbooks 1. Professional Communication Skills 2. Soft Skills for Employability 3. Career Development and Placement 4. Presentation Skills Handbook 5. Interview Preparation Guide
2.	Reference Books 1. Group Discussion Techniques 2. Resume Writing Manuals 3. Personality Development Books 4. Workplace Communication 5. Corporate Etiquette Manuals

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	1	-	1	2	2
CO2	1	1	1	2	2	2

CO3	1	2	1	2	2	3
CO4	1	2	1	2	3	3
CO5	1	2	2	3	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	1	1	-	1	2	2
CO2	1	1	1	2	2	2
CO3	1	2	1	2	2	3
CO4	1	2	1	2	3	3
CO5	1	2	2	3	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0401	COURSE NAME MEDICINAL CHEMISTRY - I	SEMESTER IV
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
45	0	0	45	3	0	0	3

Course Pre-requisites	Students should have completed foundational courses of the programme.
Course Category	Major Course
Course focus	To understand chemistry, structure-activity relationships and therapeutic applications of medicinal

	compounds.	
Rationale	This course provides understanding of drug chemistry, structure–activity relationships, and therapeutic applications of medicinal compounds.	
Course Revision/ Approval Date:	22/05/2026	
Course Objectives	After completion of the course, students will be able to: CO1. Understand drug chemistry and SAR. CO2. Explain physicochemical properties of drugs. CO3. Analyze mechanisms of drug action. CO4. Interpret synthetic approaches of medicinal agents. CO5. Apply medicinal chemistry principles in drug design.	
Course Content (Theory)	Weightage	Contact hours
Unit I: Introduction to Medicinal Chemistry Drug design, SAR, physicochemical properties, drug metabolism basics	20%	9
Unit II: Autonomic Nervous System Drugs Cholinergic drugs, adrenergic drugs, anticholinergics	20%	9
Unit III: Cardiovascular Drugs Antihypertensives, antianginal agents, antiarrhythmic drugs	20%	9
Unit IV: CNS Drugs Sedatives, hypnotics, antipsychotics, antidepressants	20%	9
Unit V: Antimicrobial Agents Sulfonamides, quinolones, β -lactam antibiotics,	20%	9

antitubercular agents		
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Instructional Method and Pedagogy:

Teaching through lectures, molecular modeling discussions and problem-solving sessions.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain principles of medicinal chemistry and SAR.	Cognitive	Understand
CO2	Interpret chemistry of autonomic nervous system drugs.	Cognitive	Apply
CO3	Analyze medicinal chemistry of cardiovascular drugs.	Cognitive	Analyze
CO4	Explain chemistry and mechanism of CNS drugs.	Cognitive	Analyze
CO5	Apply medicinal chemistry concepts in antimicrobial drug development.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Wilson and Gisvold's Medicinal Chemistry 2. Foye's Medicinal Chemistry 3. Medicinal Chemistry – Ashutosh Kar 4. Organic Medicinal Chemistry

	5. Burger's Medicinal Chemistry
2.	Reference Books 1. Drug Design and Discovery 2. Pharmaceutical Organic Chemistry 3. Medicinal Chemistry Journals 4. Current Drug Research 5. Heterocyclic Chemistry 6. Wilson & Gisvold textbook

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	1	-	1	2	2
CO2	1	1	1	2	2	2
CO3	1	2	1	2	2	3
CO4	1	2	1	2	3	3
CO5	1	2	2	3	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	1	1	-	1	2	2
CO2	1	1	1	2	2	2
CO3	1	2	1	2	2	3
CO4	1	2	1	2	3	3
CO5	1	2	2	3	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0402	COURSE NAME PHARMACOLOGY – I	SEMESTER IV
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
45	0	0	45	3	0	0	3

Course Pre-requisites	Students should have completed foundational courses of the programme.
Course Category	Major Course
Course focus	To study drug action, therapeutic effects and pharmacological mechanisms.
Rationale	This course explains mechanisms of drug action, pharmacological effects, and therapeutic uses of drugs.
Course Revision/	22/05/2026

Approval Date:			
Course Objectives	After completion of the course, students will be able to: CO1. Understand pharmacological principles. CO2. Explain drug mechanisms and therapeutic uses. CO3. Analyze adverse effects and interactions. CO4. Interpret pharmacodynamic and pharmacokinetic processes. CO5. Apply pharmacology concepts in healthcare practice.		
Course Content (Theory)	Weightage	Contact hours	
Unit I: General Pharmacology Pharmacokinetics, pharmacodynamics, receptors, adverse drug reactions	20%	9	
Unit II: Autonomic Pharmacology Cholinergic drugs, adrenergic drugs, autonomic nervous system	20%	9	
Unit III: Cardiovascular Pharmacology Antihypertensives, antianginal agents, cardiac drugs	20%	9	
Unit IV: CNS Pharmacology Sedatives, hypnotics, anticonvulsants, antidepressants	20%	9	
Unit V: Chemotherapy Antibiotics, antivirals, antifungals, antimicrobial resistance	20%	9	

Instructional Method and Pedagogy:

Teaching through lectures, case studies, pharmacological discussions and demonstrations.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain pharmacological principles and mechanisms of drug action.	Cognitive	Understand
CO2	Apply pharmacological concepts in therapeutic applications.	Cognitive	Apply
CO3	Analyze drug responses, interactions and adverse effects critically.	Cognitive	Analyze
CO4	Interpret pharmacodynamic and pharmacokinetic processes effectively.	Cognitive	Analyze
CO5	Demonstrate understanding of rational drug therapy and clinical pharmacology.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Essentials of Medical Pharmacology – K.D. Tripathi 2. Katzung Pharmacology 3. Rang and Dale Pharmacology 4. Goodman and Gilman 5. Lippincott Pharmacology
2.	Reference Books 1. Clinical Pharmacology Manuals

	2. Pharmacotherapy Handbooks 3. Drug Interaction References 4. Applied Therapeutics 5. Experimental Pharmacology
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Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	1	-	-	-
CO2	3	2	2	1	-	-
CO3	2	3	2	1	1	1
CO4	2	3	2	1	1	2
CO5	2	2	3	2	2	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	1	1	-	-	-

CO2	3	2	2	1	-	-
CO3	2	3	2	1	1	1
CO4	2	3	2	1	1	2
CO5	2	2	3	2	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0403	COURSE NAME PHARMACEUTICS – I	SEMESTER IV
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
45	0	0	45	3	0	0	3

Course Pre-requisites	Students should have completed foundational courses of the programme.
Course Category	Major Course
Course focus	To understand formulation development and pharmaceutical dosage systems
Rationale	This course imparts knowledge regarding formulation, preparation, and evaluation of pharmaceutical dosage forms.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand pharmaceutical dosage forms. CO2. Explain formulation and manufacturing processes.

	CO3. Analyze stability and compatibility studies.		
	CO4. Interpret pharmaceutical processing techniques.		
	CO5. Apply formulation development principles		
Course Content (Theory)		Weightage	Contact hours
Unit I: Pharmaceutical Dosage Forms Introduction to dosage forms, excipients, formulation additives		20%	9
Unit II: Solid Dosage Forms Powders, granules, tablets, capsules		20%	9
Unit III: Liquid Dosage Forms Syrups, suspensions, emulsions, elixirs		20%	9
Unit IV: Semisolid Dosage Forms Ointments, creams, gels, suppositories		20%	9
Unit V: Pharmaceutical Packaging Packaging materials, labeling, storage systems		20%	9

Instructional Method and Pedagogy:

Teaching through lectures, formulation demonstrations and industrial case studies

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain formulation principles of pharmaceutical dosage forms.	Cognitive	Understand
CO2	Apply pharmaceutical processing and manufacturing techniques	Cognitive	Apply

	effectively.		
CO3	Analyze stability and compatibility of pharmaceutical formulations.	Cognitive	Analyze
CO4	Interpret formulation evaluation and packaging requirements accurately.	Cognitive	Analyze
CO5	Demonstrate understanding of pharmaceutical formulation development.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Aulton's Pharmaceutics 2. Remington Pharmacy 3. Modern Pharmaceutics 4. Pharmaceutics – Lachman 5. Pharmaceutical Dosage Forms 6. Pharmaceutical Analysis – Chatwal & Anand
2.	Reference Books 1. Controlled Drug Delivery 2. Industrial Pharmacy 3. Pharmaceutical Technology 4. Formulation Development Manuals 5. Drug Stability Studies 6. Indian pharmacopeia 7. British Pharmacopoeia (BP) 8. USP–NF 9. WHO TRS 10. FDA Guidance Documents 11. CDSCO Guidance Documents 12. Indian Patent Manual

	13. Drugs & Cosmetics Act
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Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	2	-	-	-
CO2	3	2	3	1	-	-
CO3	2	3	3	1	1	1
CO4	2	2	3	1	1	2
CO5	2	2	3	2	2	3

Mapping of POs & COs



COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	1	2	-	-	-
CO2	3	2	3	1	-	-
CO3	2	3	3	1	1	1
CO4	2	2	3	1	1	2
CO5	2	2	3	2	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0404	COURSE NAME PHARMACEUTICAL ANALYSIS – II	SEMESTER IV
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
0	60	0	60	0	2	0	2

Course Pre-requisites	Students should have completed foundational courses of the programme.
Course Category	Major Course
Course focus	To develop advanced pharmaceutical analytical competencies.
Rationale	This course develops analytical competencies for pharmaceutical quality assurance and instrumental drug analysis.
Course Revision/ Approval Date:	22/05/2026
	After completion of the course, students will be able

Course Objectives	to:
	CO1. Understand advanced analytical techniques used in pharmaceutical analysis and quality assurance.
	CO2. Explain chromatographic, spectroscopic and instrumental methods for drug analysis.
	CO3. Analyze pharmaceutical formulations using qualitative and quantitative analytical techniques.
	CO4. Interpret analytical validation data, calibration parameters and quality control systems.
	CO5. Develop analytical and problem-solving skills required for pharmaceutical quality assurance and research laboratories.

	Practical	Weightage	Contact hours
	Appropriate laboratory experiments, demonstrations, and skill-based exercises related to the course contents shall be conducted to reinforce theoretical concepts and develop professional competencies.	100%	60

Instructional Method and Pedagogy:

Teaching through analytical laboratory training and instrumental analysis exercises.

Course Outcome:	Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:		

CO1	Explain advanced analytical techniques used in pharmaceutical analysis.	Cognitive	Understand
CO2	Apply chromatographic and spectroscopic methods for drug analysis.	Cognitive	Apply
CO3	Analyze pharmaceutical formulations quantitatively and qualitatively.	Cognitive	Analyze
CO4	Interpret analytical validation and quality control parameters effectively.	Cognitive	Analyze
CO5	Demonstrate analytical competency in pharmaceutical quality assurance.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Pharmaceutical Analysis 2. Instrumental Methods of Chemical Analysis 3. Textbook of Pharmaceutical Analysis 4. Analytical Chemistry 5. Practical Pharmaceutical Chemistry 6. Pharmaceutical Analysis – Chatwal & Anand
2.	Reference Books 1. Vogel's Textbook of Quantitative Chemical Analysis 2. Modern Pharmaceutical Analysis 3. Pharmaceutical Drug Analysis 4. Analytical Instrumentation Handbook

	5. Remington: The Science and Practice of Pharmacy
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Evaluation Scheme		Total Marks
Practical Marks	Attendance	05 marks
	Practical Exam	20 marks
	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	1	-	-	-
CO2	3	3	2	1	-	-
CO3	2	3	3	1	1	1
CO4	2	3	3	2	2	1
CO5	2	3	3	2	2	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	2	1	-	-	-
CO2	3	3	2	1	-	-
CO3	2	3	3	1	1	1
CO4	2	3	3	2	2	1
CO5	2	3	3	2	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0405	COURSE NAME ANALYTICAL INSTRUMENTATION	SEMESTER IV
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
0	60	0	60	0	2	0	2

Course Pre-requisites	Students should have completed foundational courses of the programme.
Course Category	Major Course
Course focus	To understand operation and applications of analytical instruments.
Rationale	This course provides practical understanding of modern analytical instruments used in pharmaceutical testing and research.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand principles, components and operation of pharmaceutical analytical instruments. CO2. Explain analytical instrumentation techniques used in pharmaceutical analysis and quality control. CO3. Analyze pharmaceutical samples using modern instrumental analytical methods. CO4. Interpret instrumental outputs, analytical data and laboratory reports accurately.

	CO5. Develop practical skills in pharmaceutical instrumentation, calibration and analytical testing procedures.

	Practical	Weightage	Contact hours
	Appropriate laboratory experiments, demonstrations, and skill-based exercises related to the course contents shall be conducted to reinforce theoretical concepts and develop professional competencies.	100%	60

Instructional Method and Pedagogy:

Teaching through hands-on instrumentation training, demonstrations and practical exercises.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain principles and operation of pharmaceutical analytical instruments.	Cognitive	Understand
CO2	Apply analytical instrumentation techniques in pharmaceutical analysis.	Cognitive	Apply
CO3	Analyze pharmaceutical samples using instrumental methods.	Cognitive	Analyze
CO4	Interpret instrumental outputs	Cognitive	Analyze

	and analytical reports accurately.		
CO5	Demonstrate practical skills in pharmaceutical instrumentation and testing.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Instrumental Methods of Chemical Analysis 2. Analytical Instrumentation 3. Instrumental Analysis 4. Principles of Instrumental Analysis 5. Practical Pharmaceutical Chemistry 6. Pharmaceutical Analysis
2.	Reference Books 1. Analytical Instrumentation Handbook 2. Pharmaceutical Analysis 3. Vogel's Textbook of Quantitative Chemical Analysis 4. Modern Instrumental Analysis 5. HPLC Practical and Industrial Applications 6. Spectrometric Identification of Organic Compounds 7. Analytical Chemistry 8. IP, USP General Chapters

Evaluation Scheme		Total Marks
Practical Marks	Attendance	05 marks
	Practical Exam	20 marks
	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	1	-	-	-
CO2	3	3	2	1	-	-
CO3	2	3	3	1	1	1
CO4	2	3	3	2	2	1
CO5	2	3	3	2	2	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	2	1	-	-	-
CO2	3	3	2	1	-	-
CO3	2	3	3	1	1	1
CO4	2	3	3	2	2	1
CO5	2	3	3	2	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE AECC0406	COURSE NAME BUISUNESS MANAGEMENT	SEMESTER IV
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
30	0	0	30	2	0	0	2

Course Pre-requisites	Students should have completed foundational courses of the programme.
Course Category	Ability Enhancement
Course focus	Fundamentals of Business Management and Pharmaceutical Business Operations
Rationale	This course introduces students to the principles and practices of management, entrepreneurship, organizational behaviour, marketing, finance, and strategic decision-making in pharmaceutical industries. It prepares students to understand business functions, industrial operations, leadership, and managerial skills required in pharmaceutical manufacturing, healthcare organizations, and entrepreneurship.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	after successful completion of the course, students will be able to: CO1. Understand the fundamental concepts and principles of management applicable to pharmaceutical organizations. CO2. Explain organizational structure, leadership, human

	resource management, and team-building strategies. CO3. Apply principles of marketing, finance, and supply chain management in pharmaceutical industries. CO4. Understand entrepreneurship, innovation, project management, and business ethics in healthcare sectors. CO5. Develop managerial decision-making, communication, and strategic planning skills for pharmaceutical enterprises.

Course Content (Theory)	Weightage	Contact hours
Unit I: Principles of Management Introduction to Management, Evolution of Management Thought, Functions of Management (Planning, Organizing, Staffing, Directing & Controlling), Decision Making, Organizational Structure, Managerial Roles & Skills	25%	7
Unit II: Organizational Behaviour & Human Resource Management Organizational Behaviour, Motivation Theories, Leadership Styles, Communication Skills, Team Building, Conflict Management, Human Resource Planning, Recruitment & Selection, Performance Appraisal, Employee Development	25%	7
Unit III: Pharmaceutical Business Management Pharmaceutical Marketing, Product Life Cycle, Brand Management, Sales Management, Supply Chain & Inventory Management, Financial Management Basics, Cost Analysis, Budgeting, Business Analytics, Digital Healthcare Business Models	25%	8
Unit IV: Entrepreneurship & Strategic Management	25%	8



Entrepreneurship Development, Business Plan Preparation, Start-up Ecosystem, Intellectual Property & Commercialization, Strategic Management, Corporate Social Responsibility (CSR), Business Ethics, Risk Management, Pharmaceutical Case Studies		
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Instructional Method and Pedagogy:

Teaching through patent database analysis, seminars and case-based discussions.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain principles of management and organizational functions in pharmaceutical industries.	Understand, Remember	Define, Explain, Classify
CO2	Apply leadership, communication, and human resource management principles in organizational settings.	Apply, Analyze	Demonstrate, Differentiate, Organize
CO3	Analyze marketing, finance, and supply chain practices in pharmaceutical business operations.	Apply, Analyze	Analyze, Interpret, Evaluate
CO4	Evaluate entrepreneurship opportunities, strategic planning, and ethical business practices in pharmaceutical sectors.	Evaluate, Create	Design, Assess, Develop
CO5	Develop managerial, communication, and decision-making skills for pharmaceutical	Apply, Create	Demonstrate, Design, Develop

	enterprises.		
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Learning Resources	
1.	Textbooks 1. Business Organization and Management – C.B. Gupta. 2. Principles and Practice of Management – L.M. Prasad.
2.	Reference Books 1. Business Management – P.C. Tripathi & P.N. Reddy. 2. Entrepreneurship Development – S.S. Khanka. 3. Marketing Management – Philip Kotler & Kevin Lane Keller. 4. Operations Management – Krajewski, Ritzman & Malhotra. 5. Strategic Management – Fred R. David. 6. Business Environment – Francis Cherunilam. E-Resources 7. Startup India Portal 8. MSME Government of India 9. Invest India 10. Ministry of Corporate Affairs (MCA) 11. DPIIT Startup Resources

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	c	2	1	2	2	1
CO2	1	3	1	3	3	1
CO3	2	2	3	2	2	2
CO4	2	3	3	2	3	2
CO5	2	3	2	3	2	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	3	2	2	2	1
CO2	1	2	2	3	3	-
CO3	2	3	3	2	2	2
CO4	1	2	3	2	3	2
CO5	2	3	3	3	2	2

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0407	COURSE NAME PATENT REVIEW	SEMESTER IV
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
0	30	15	45	0	1	1	2

Course Pre-requisites	Students should have completed foundational courses of the programme.
Course Category	Skill Enhancement Course
Course focus	To introduce patent systems, intellectual property rights and patent analysis relevant to pharmaceutical sciences.
Rationale	This course introduces intellectual property concepts, patent analysis, and pharmaceutical innovation protection systems.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand concepts of patents, intellectual property rights and innovation protection systems. CO2. Explain patent filing procedures, patent databases and documentation techniques. CO3. Analyse pharmaceutical patent literature and intellectual property regulations. CO4. Interpret legal, ethical and regulatory aspects of patent systems in pharmaceutical industries. CO5. Develop skills related to patent review, technology transfer and innovation management.

	Practical	Weightage	Contact hours
	Appropriate laboratory experiments, demonstrations, and skill-based exercises related to the course contents shall be conducted to reinforce theoretical concepts and	100%	30

	develop professional competencies.		
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Instructional Method and Pedagogy:

Teaching through patent database analysis, seminars and case-based discussions.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain concepts of patents and intellectual property rights.	Cognitive	Understand
CO2	Apply patent search and documentation techniques effectively.	Cognitive	Apply
CO3	Analyze pharmaceutical patent literature critically.	Cognitive	Analyze
CO4	Interpret legal and regulatory aspects of patent systems accurately.	Cognitive	Analyze
CO5	Demonstrate skills in patent review and innovation management.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks - Intellectual Property Rights - Patent Law and Practice - Pharmaceutical Jurisprudence and Ethics - Intellectual Property Rights for Engineers - Textbook of Intellectual Property Rights

2.	12.Reference Books 13.Patent Searching: Tools and Techniques 14.WIPO Intellectual Property Handbook 15.Guidebook on Indian Patent Law 16.Intellectual Property Rights in Pharmaceutical Industry 17.Patent Drafting and Patent Filing
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Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	-	1	1	3	1
CO2	1	1	1	1	3	1
CO3	1	1	2	2	3	2
CO4	1	1	2	2	3	2
CO5	1	2	2	3	3	3

Mapping of POs & COs



COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	1	-	1	1	3	1
CO2	1	1	1	1	3	1
CO3	1	1	2	2	3	2
CO4	1	1	2	2	3	2
CO5	1	2	2	3	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0408	COURSE NAME PUBLIC HEALTH SYSTEM	SEMESTER IV
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
45	0	0	45	3	0	0	3

Course Pre-requisites	Students should have completed foundational courses of the programme.
Course Category	Interdisciplinary Course
Course focus	To understand public health infrastructure, healthcare delivery systems and disease prevention strategies.
Rationale	This course explains healthcare delivery systems, public health policies, and disease prevention strategies.
Course Revision/ Approval Date:	22/05/2026

Course Objectives	After completion of the course, students will be able to:.	
Course Content (Theory)	Weightage	Contact hours
Unit I: Introduction to Public Health Public health concepts, determinants of health, healthcare indicators	20%	9
Unit II: Healthcare Systems National health programmes, healthcare delivery systems, primary healthcare	20%	9
Unit III: Epidemiology and Disease Control Epidemiological methods, communicable diseases, vaccination programmes	20%	9
Unit IV: Environmental and Occupational Health Water sanitation, waste management, occupational hazards	20%	9
Unit V: Global Health and Healthcare Policies WHO, global healthcare policies, health economics, healthcare ethics	20%	9

Instructional Method and Pedagogy:

Teaching through lectures, healthcare case studies and community health discussions.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain structure and functions of	Cognitive	Understand

	public health systems.		
CO2	Apply healthcare delivery and disease prevention concepts effectively.	Cognitive	Apply
CO3	Analyze public health policies and epidemiological systems critically.	Cognitive	Analyze
CO4	Interpret healthcare management and community health programs accurately.	Cognitive	Analyze
CO5	Demonstrate awareness of public health responsibilities and healthcare services.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Textbook of Preventive and Social Medicine 2. Community Pharmacy Practice 3. Public Health and Preventive Medicine 4. Essentials of Community Medicine 5. Principles of Epidemiology
2.	Reference Books 1. Park's Textbook of Preventive and Social Medicine 2. Community Medicine with Recent Advances 3. Hospital and Clinical Pharmacy 4. Public Health Management Principles 5. Pharmaceutical Jurisprudence and Ethics 6. Health System Management 7. Introduction to Public Health

Evaluation Scheme	Total Marks
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Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	1	1	1	2	1
CO2	2	1	2	1	2	2
CO3	2	2	2	2	2	2
CO4	2	2	2	2	3	2
CO5	2	2	3	3	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	1	1	1	2	1
CO2	2	1	2	1	2	2
CO3	2	2	2	2	2	2
CO4	2	2	2	2	3	2
CO5	2	2	3	3	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None





Teaching Scheme Semester – V

Semester – V							
Sr. No.	Course Code	Course Title	L	T	P	C	Marks
A. Ability Enhancement Compulsory Course							
1	AECC501	Entrepreneurship Development	2	0	0	2	100
B. Major Course							
2	BMP0501	Medicinal Chemistry – II	3	0	0	3	100
3	BMP0502	Pharmacology – II	3	0	0	3	100
4	BMP0503	Pharmaceutics – II	3	0	0	3	100
5	BMP0504	Biopharmaceutics & Pharmacokinetics	2	0	1	3	150
C. Minor Course							
6	BMP0505	Regulatory Affairs	4	0	0	4	100
D. Skill Enhancement Course							
7	BMP0506	Internship – III (Instrumentation Skills)	0	0	2	2	100
E. Interdisciplinary Course							
8	BMP0507	Healthcare Analytics	2	0	1	3	150
Total						23	900



COURSE CODE AECC501	COURSE NAME ENTREPRENEURSHIP DEVELOPMENT	SEMESTER V
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
30	0	0	30	2	0	0	2

Course Pre-requisites	Knowledge and skills of entrepreneurship.
Course Category	Ability Enhancement Compulsory Course
Course focus	To develop entrepreneurial and startup management competencies.
Rationale	Entrepreneurs have been instrumental in spurring social change and improving the way people live and work. They help raise the standard of living for everyone by creating jobs and making products safer, less expensive, and more functional.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to CO1. Students will develop skills for evaluating, articulating, refining, and pitching a new product or service offering CO2. Identify the elements of success of entrepreneurial ventures CO3. Analyze Feasibility of the project (Financial and Non-Financial) and interpret business plan. CO4. Demonstrate and present successful work, collaboration and division of tasks in a multidisciplinary and multicultural team.



	CO5. Demonstrate understanding and application of the tools necessary to create sustainable and viable Businesses.	
Course Content (Theory)	Weightage	Contact hours
Unit 1: Entrepreneurship Concept, knowledge and skills requirement; characteristic of successful entrepreneurs; role of entrepreneurship in economic development; entrepreneurship process; factors impacting emergence of entrepreneurship; managerial vs. entrepreneurial approach and emergence of entrepreneurship. Entrepreneurial Motivation.	20%	6
Unit 2: Creativity and Entrepreneurship, Steps in Creativity; Product Design & Influencing Factors (Legal, Ethical & Environmental); Generating business idea –sources of new ideas, methods of generating ideas, creative problem solving, opportunity recognition; environmental scanning, competitor and industry analysis.	20%	6
Unit 3: Feasibility Study (Non-financial Aspects) Market feasibility, Technical feasibility, operational feasibility, Legal feasibility, Human Resource Feasibility, Supply Feasibility.	20%	6
Unit 4: Feasibility Study (financial Aspects) Cost classification- Fixed vs. Variable; Cost Determination-Material, Labour, Overheads; Product Profitability- Concepts of Break-even, Margin of Safety, Angle of Incidence, Key-factor, Profit-Volume ratio; Balance Sheet & Profit & Loss Account-Concepts & Structure; Budgeting;	20%	6

Financing Schemes from Government, specially schemes for women; Venture Capital & Angel Investing		
Unit 5: Detailed Project Report & Business Plan Project Report- components; Preparation of Business Plan; Pitching the Business Plan, Attracting Angel Investors. (A group of THREE students will prepare a DPR and Business Plan on selected product or service in the course as a Project/Assignment.	20%	6

Instructional Method and Pedagogy:

Utilizing models, PowerPoint Presentations, group discussions and seminars are some of the methods adopted to improve the student ability to grasp the principles of environmental studies.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Students will develop skills for evaluating, articulating, refining, and pitching a new product or service offering	Evaluate	Define, Classify and describe
CO2	Identify the elements of success of entrepreneurial ventures	Apply and Understand	Define, Classify, Describe, & Examine
CO3	Analyse Feasibility of the project (Financial and Non-Financial) and interpret business plan	Analysis	Define, Classify, Describe,

CO4	Demonstrate and present successful work, collaboration and division of tasks in a multidisciplinary and multicultural team.	Create and Understand	Demonstrate and Examine
CO5	Demonstrate understanding and application of the tools necessary to create sustainable and viable Businesses	Create and Understand	Define, Classify, Describe, Demonstrate and Examine

Learning Resources	
1.	Textbooks 1. Fundamentals of Entrepreneurship. 2. Managing Entrepreneurship
2.	Reference Books 1. Holt DH. Entrepreneurship: New Venture Creation. 2. Kaplan JM Patterns of Entrepreneurship. Gupta CB, Khanka SS. 3. Entrepreneurship and Small Business Management, Sultan Chand & Sons.

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	1	3	2	-
CO2	2	-	1	1	3	-
CO3	2	-	1	-	-	-
CO4	2	3	2	2	-	1
CO5	3	1	3	2	1	2

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	2	1	3	1	1
CO2	1	2	1	1	3	1
CO3	2	2	3	2	2	2
CO4	2	2	1	3	2	2
CO5	2	2	3	3	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0501	COURSE NAME MEDICINAL CHEMISTRY - II	SEMESTER V
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
45	0	0	45	3	0	0	3

Course Pre-requisites	Student should have cleared 12th Science		
Course Category	Mandatory Course		
Course focus	To study advanced medicinal chemistry and drug design concepts.		
Rationale	This course provides detailed understanding of pharmacological therapies, drug interactions, and clinical applications.		
Course Revision/ Approval Date:	22/05/2026		
Course Objectives	After completion of the course, students will be able to: CO1.To understand advanced medicinal chemistry and drug design concepts. CO2.To explain SAR and molecular modification approaches in drug development. CO3.To analyze mechanisms and therapeutic applications of medicinal compounds. CO4.To interpret synthetic pathways and pharmacological relevance of drugs. CO5.To develop problem-solving skills related to medicinal chemistry research.		
Course Content (Theory)		Weightage	Contact hours
Unit I: Drug Design and SAR Drug design principles, quantitative SAR, prodrugs, molecular modification		20%	9
Unit II: Anti-Infective Agents Antibiotics, antivirals, antifungals, antimalarial agents		20%	9
Unit III: Anticancer and Immunological Agents		20%	9

Anticancer drugs, immunosuppressants, immunomodulators		
Unit IV: Endocrine and Metabolic Drugs Antidiabetics, thyroid drugs, steroid hormones	20%	9
Unit V: Advanced Therapeutic Agents Toxicology CNS drugs, cardiovascular drugs, peptide drugs, biotechnology-derived therapeutics	20%	9

Instructional Method and Pedagogy:

Teaching through lectures, SAR analysis and pharmaceutical case studies.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain advanced medicinal chemistry and drug discovery concepts.	Cognitive	Understand
CO2	Apply SAR and molecular design principles in medicinal chemistry.	Cognitive	Apply
CO3	Analyze mechanisms and therapeutic applications of medicinal compounds.	Cognitive	Analyze
CO4	Interpret synthetic pathways and pharmaceutical relevance of drugs effectively.	Cognitive	Analyze
CO5	Demonstrate advanced understanding of medicinal chemistry in drug development.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Medicinal Chemistry – Ashutosh Kar 2. Foye's Medicinal Chemistry
2.	Reference Books 1. Burger's Medicinal Chemistry 2. Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry 3. Introduction to Medicinal Chemistry

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	1	-	-	1
CO2	3	2	2	1	-	2
CO3	2	3	2	1	1	2
CO4	2	3	3	2	1	2

CO5	2	2	3	2	2	3
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Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	1	1	-	-	1
CO2	3	2	2	1	-	2
CO3	2	3	2	1	1	2
CO4	2	3	3	2	1	2
CO5	2	2	3	2	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0502	COURSE NAME PHARMACOLOGY – II	SEMESTER V
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
45	0	0	45	3	0	0	3

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Mandatory Course
Course focus	To understand advanced pharmaceutical formulation and manufacturing systems.
Rationale	This course focuses on advanced dosage forms, pharmaceutical manufacturing, and formulation technologies.



Course Revision/ Approval Date:	22/05/2026		
Course Objectives	After completion of the course, students will be able to: CO1. Understand advanced pharmacological principles and therapeutic systems. CO2. Explain mechanisms of action and clinical applications of drugs acting on major organ systems. CO3. Analyze adverse drug reactions, contraindications and drug interactions. CO4. Interpret pharmacological responses and therapeutic outcomes in disease management. CO5. Develop knowledge regarding rational drug therapy and safe clinical use of medicines.		
Course Content (Theory)		Weightage	Contact hours
Unit I: Endocrine Pharmacology Drug design Hormones, antidiabetic drugs, thyroid drugs, corticosteroids		20%	9
Unit II: Gastrointestinal Pharmacology Antiulcer agents, laxatives, antidiarrheals, antiemetics		20%	9
Unit III: Respiratory Pharmacology Anticancer d Bronchodilators, antiasthmatics, antitussives		20%	9
Unit IV: Chemotherapy and Antimicrobials Antibiotics, antiviral drugs, antifungal agents, resistance mechanisms		20%	9
Unit V: Toxicology and Clinical Pharmacology Toxicology principles, poisoning management, therapeutic drug monitoring		20%	9

Instructional Method and Pedagogy:

Teaching through lectures, industrial examples and formulation development activities.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain advanced pharmacological systems and mechanisms of therapeutic agents.	Cognitive Domain	Understand
CO2	Apply pharmacological principles in treatment planning and patient care.	Cognitive Domain	Apply
CO3	Analyze drug interactions, adverse effects and therapeutic responses critically.	Cognitive Domain	Analyze
CO4	Interpret clinical applications and pharmacological data accurately.	Cognitive Domain	Analyze
CO5	Demonstrate understanding of rational pharmacotherapy and safe medication practices.	Cognitive Domain	Apply, Create

Learning Resources	
1.	Textbooks 1. Essentials of Medical Pharmacology 2. Pharmacology by K.D. Tripathi 3. Basic and Clinical Pharmacology 4. Lippincott Illustrated Reviews: Pharmacology 5. Textbook of Pharmacology



2.	Reference Books 1. Goodman and Gilman's The Pharmacological Basis of Therapeutics 2. Clinical Pharmacology 3. Review of Pharmacology 4. Pharmacology and Pharmacotherapeutics 5. Medical Pharmacology 6. Applied Pharmacology 7. Handbook of Experimental Pharmacology
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Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	1	-	-	1
CO2	3	2	2	1	1	1
CO3	2	3	2	1	1	2
CO4	2	3	2	2	2	2

CO5	2	2	3	2	2	3
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Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	1	1	-	-	1
CO2	3	2	2	1	1	1
CO3	2	3	2	1	1	2
CO4	2	3	2	2	2	2
CO5	2	2	3	2	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0503	COURSE NAME PHARMACEUTICS – II	SEMESTER V
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
45	0	0	45	3	0	0	3

Course Pre-requisites	Students should have completed foundational management and communication courses of the programme.
Course Category	Major Course
Course focus	To understand advanced pharmaceutical formulations, manufacturing processes and novel dosage systems
Rationale	This course focuses on advanced dosage forms, pharmaceutical manufacturing, and formulation

	technologies.		
Course Revision/ Approval Date:	22/05/2026		
Course Objectives	After completion of the course, students will be able to: CO1. Understand advanced pharmaceutical dosage forms and drug delivery systems. CO2. Explain formulation development and manufacturing processes of pharmaceutical products. CO3. Analyze pharmaceutical processing, packaging and stability requirements. CO4. Interpret evaluation parameters and quality control methods for dosage forms. CO5. Develop knowledge regarding industrial pharmaceuticals and formulation technology		
Course Content (Theory)	Weightage	Contact hours	
Unit I: Sterile Dosage Forms Parenterals, ophthalmics, aseptic processing, sterilization methods	20%	9	
Unit II: Controlled Drug Delivery Systems Sustained release systems, targeted delivery, transdermal systems	20%	9	
Unit III: Pharmaceutical Manufacturing GMP, industrial manufacturing processes, quality assurance	20%	9	
Unit IV: Cosmetic and Herbal Formulations Cosmetic preparations, herbal products, nutraceuticals	20%	9	
Unit V: Packaging and Stability Studies Packaging systems, stability testing, storage conditions	20%	9	

Instructional Method and Pedagogy:

Utilizing models, PowerPoint Presentations, films on various topics of physical chemistry, group discussions, quizzes and seminars are some of the methods adopted to improve the student ability to grasp the principles of physical chemistry. The hands-on sessions during laboratory sessions will help students to apply the concepts learnt and analyse the results and draw conclusion.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain advanced pharmaceutical dosage forms and formulation principles.	Cognitive Domain	Understand
CO2	Apply formulation and manufacturing techniques in pharmaceutical product development.	Cognitive Domain	Apply
CO3	Analyze pharmaceutical processing, stability and packaging systems critically.	Cognitive Domain	Analyze
CO4	Interpret quality control and evaluation methods for pharmaceutical products accurately.	Cognitive Domain	Analyze
CO5	Demonstrate understanding of industrial pharmaceuticals and advanced drug delivery technologies.	Cognitive Domain	Apply, Create

Learning Resources	
1.	Textbooks 1. Theory and Practice of Industrial Pharmacy



	2. Pharmaceutics: The Science of Dosage Form Design 3. Modern Pharmaceutics 4. Textbook of Pharmaceutics 5. Aulton's Pharmaceutics 6. Remington: The Science and Practice of Pharmacy
2.	Reference Books 1. Pharmaceutical Dosage Forms and Drug Delivery Systems 2. Lachman's Industrial Pharmacy 3. Pharmaceutics 4. Bentley's Textbook of Pharmaceutics 5. Encyclopedia of Pharmaceutical Technology

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	2	-	1	1
CO2	3	2	3	1	1	1
CO3	2	3	3	1	2	2



C04	2	3	3	2	2	2
C05	2	2	3	2	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
C01	3	1	2	-	1	1
C02	3	2	3	1	1	1
C03	2	3	3	1	2	2
C04	2	3	3	2	2	2
C05	2	2	3	2	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0504	COURSE NAME BIOPHARMACEUTICS & PHARMACOKINETICS	SEMESTER V
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
30	30	0	60	2	1	0	3

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Mandatory Course
Course focus	To study drug absorption, metabolism and pharmacokinetic modeling
Rationale	This course explains drug absorption, distribution, metabolism, excretion, and dosage regimen optimization.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand principles of biopharmaceutics and pharmacokinetics. CO2. Explain absorption, distribution, metabolism and excretion of drugs. CO3. Analyze compartment models and bioavailability concepts. CO4. Interpret pharmacokinetic data and dosage regimen calculations. CO5. Develop knowledge regarding therapeutic drug monitoring and clinical applications.

Course Content (Theory)	Weightage	Contact hours
Unit I: Introduction to Biopharmaceutics Drug absorption, bioavailability, bioequivalence, biological barriers	20%	6
Unit II: Pharmacokinetic Principles Compartment models, elimination kinetics, clearance, half-life	20%	6
Unit III: Drug Distribution and Metabolism Protein binding, volume of distribution, hepatic metabolism	20%	6
Unit IV: Dosage Regimen Design Multiple dosing, loading dose, maintenance dose, IV infusion	20%	6
Unit V: Clinical Pharmacokinetics Therapeutic drug monitoring, pharmacokinetic calculations, clinical applications	20%	6

	Practical	Weightage	Contact hours
	Appropriate laboratory experiments, demonstrations, and skill-based exercises related to the course contents shall be conducted to reinforce theoretical concepts and develop professional competencies.	100%	30

Instructional Method and Pedagogy:

Teaching through lectures, numerical exercises and pharmacokinetic simulations.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain principles of biopharmaceutics and pharmacokinetics.	Cognitive	Understand
CO2	Apply pharmacokinetic concepts in dosage regimen design effectively.	Cognitive	Apply
CO3	Analyze ADME processes and bioavailability studies critically.	Cognitive	Analyze
CO4	Interpret pharmacokinetic data and compartment models accurately.	Cognitive	Analyze
CO5	Demonstrate understanding of drug disposition and therapeutic optimization systems.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Applied Biopharmaceutics and Pharmacokinetics 2. Biopharmaceutics and Pharmacokinetics Brahmkar & Jaiswal 3. Clinical Pharmacokinetics 4. Basic Pharmacokinetics 5. Pharmacokinetics
2.	Reference Books 1. Biopharmaceutics and Clinical Pharmacokinetics 2. Clinical Pharmacokinetics Concepts and Applications 3. Pharmacokinetics for the Pharmaceutical Scientist

	4. Basic Clinical Pharmacokinetics 5. Drug Disposition and Pharmacokinetics
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Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks
Practical Marks	Attendance	05 marks
	Practical Exam	20 marks
	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	1	-	1	2
CO2	3	2	2	1	1	2
CO3	2	3	2	1	2	3
CO4	2	3	2	2	2	3
CO5	2	2	3	2	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	1	1	-	1	2
CO2	3	2	2	1	1	2
CO3	2	3	2	1	2	3
CO4	2	3	2	2	2	3
CO5	2	2	3	2	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0505	COURSE NAME REGULATORY AFFAIRS	SEMESTER V
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
60	0	0	60	4	0	0	4

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Mandatory Course
Course focus	To understand pharmaceutical regulations and compliance systems.
Rationale	This course provides understanding of pharmaceutical regulations, drug approval processes, and compliance systems.
Course Revision/ Approval Date:	22/05/2026
	After completion of the course, students will be able to: CO1. Understand pharmaceutical regulatory systems and guidelines.



Course Objectives	CO2. Explain drug approval procedures and documentation requirements.	
	CO3. Analyze national and international regulatory frameworks.	
	CO4. Interpret GMP, GLP and quality compliance systems.	
	CO5. Develop professional skills related to pharmaceutical regulatory affairs.	
Course Content (Theory)		Contact hours
Introduction to regulatory affairs Drug regulatory authorities		20% 12
Drug approval processes CTD and dossier preparation		20% 12
GMP, GLP and GCP guidelines		20% 12
Regulatory documentation Pharmacovigilance regulations		20% 12
ICH guidelines FDA, CDSCO and EMA regulations Intellectual property and ethics		20% 12

Instructional Method and Pedagogy:

Teaching through lectures, regulatory documentation exercises and case studies.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain pharmaceutical regulatory systems and guidelines.	Cognitive	Understand

CO2	Apply regulatory documentation and compliance procedures effectively.	Cognitive	Apply
CO3	Analyze drug approval and quality assurance systems critically.	Cognitive	Analyze
CO4	Interpret national and international pharmaceutical regulations accurately.	Cognitive	Analyze
CO5	Demonstrate understanding of regulatory affairs in pharmaceutical industries.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Pharmaceutical Regulatory Affairs 2. Good Manufacturing Practices 3. Pharmaceutical Jurisprudence 4. International Pharmaceutical Regulations 5. Regulatory Affairs from Wikipedia to Pharma
2.	Reference Books 1. ICH Quality Guidelines 2. WHO GMP Guidelines 3. FDA Regulatory Affairs 4. Pharmaceutical Quality Assurance 5. Guidelines for Drug Regulatory Submissions 6. Drugs & Cosmetics Act,

Evaluation Scheme	Total Marks
Theory: Mid semester Marks	20 marks

Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks
Project/ Industrial Internship Marks	Quantity of the Project/Industrial in terms of Language, Presentation & format.	20 marks
	Practical understanding of the subject on the Project/Industrial	10 marks
	Industry/ University mentor's feedback on the Project/ Industrial.	10 marks
	Attendance	10 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	1	1	1	3	1
CO2	2	2	2	1	3	1
CO3	2	3	2	2	3	2
CO4	2	3	2	2	3	2
CO5	2	2	3	3	3	3



Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	1	1	1	3	1
CO2	2	2	2	1	3	1
CO3	2	3	2	2	3	2
CO4	2	3	2	2	3	2
CO5	2	2	3	3	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0506	COURSE NAME INTERNSHIP – III (INSTRUMENTATION SKILLS)	SEMESTER V
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
0	60	0	60	0	2	0	2

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Mandatory Course
Course focus	To develop instrumentation and industrial analytical skills.
Rationale	This course provides industrial training and practical exposure to pharmaceutical instrumentation and analytical operations.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand principles and applications of analytical instruments used in pharmaceutical industries. CO2. Perform calibration, operation and maintenance of pharmaceutical instruments. CO3. Analyze pharmaceutical samples using instrumental analytical techniques. CO4. Interpret analytical reports and industrial documentation procedures. CO5. Develop professional analytical and instrumentation handling skills.

Instructional Method and Pedagogy:

Experiential learning through industrial training and instrumentation practice.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Perform pharmaceutical analytical operations using modern instruments safely.	Cognitive	Understand
CO2	Apply calibration and validation procedures in laboratory settings effectively.	Cognitive	Apply
CO3	Analyze pharmaceutical samples using instrumentation techniques critically.	Cognitive	Analyze
CO4	Interpret analytical reports and industrial documentation accurately.	Cognitive	Analyze
CO5	Demonstrate industrial analytical and instrumentation competencies professionally.	Cognitive	Apply, Create

Learning Resources

1.	Textbooks 1. Instrumental Methods of Chemical Analysis 2. Practical Pharmaceutical Chemistry 3. Pharmaceutical Analysis
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	4. HPLC Practical and Industrial Applications 5. Analytical Instrumentation Handbook
2.	Reference Books 1. WHO Laboratory Guidelines 2. Instrument Calibration Manuals 3. GMP and GLP Standards 4. Quality Control in Pharmaceutical Industry 5. Practical HPLC Method Development

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks
Practical Marks	Attendance	05 marks
	Practical Exam	20 marks
	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks
Project/ Industrial Internship Marks	Quantity of the Project/Industrial in terms of Language, Presentation & format.	20 marks
	Practical understanding of the	10 marks



	subject on the Project/Industrial	
	Industry/ University mentor's feedback on the Project/ Industrial.	10 marks
	Attendance	10 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	1	-	1	1
CO2	2	3	2	1	1	2
CO3	2	3	3	1	1	2
CO4	2	2	3	2	2	2
CO5	2	2	3	3	2	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	3	1	-	1	1
CO2	2	3	2	1	1	2
CO3	2	3	3	1	1	2
CO4	2	2	3	2	2	2
CO5	2	2	3	3	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BSP0507	COURSE NAME HEALTHCARE ANALYTICS	SEMESTER V
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
30	30	0	60	2	1	0	3

Course Pre-requisites	Student should have cleared 12th Science		
Course Category	Mandatory Course		
Course focus	To analyze healthcare data and digital healthcare systems.		
Rationale	This course introduces healthcare data analysis, statistical interpretation, and digital decision-making systems		
Course Revision/ Approval Date:	22/05/2026		
Course Objectives	After completion of the course, students will be able to: CO1. Understand healthcare analytics and healthcare information systems. CO2. Explain statistical and analytical tools used in healthcare management. CO3. Analyze healthcare datasets and healthcare trends critically. CO4. Interpret healthcare databases and digital health systems effectively. CO5. Develop analytical skills for healthcare decision-making and pharmaceutical applications.		
Course Content (Theory)		Weightage	Contact hours



Unit I: Introduction to Healthcare Analytics Healthcare data systems, health informatics, electronic health records	20%	6
Unit II: Data Analytics and Statistics Data visualization, descriptive statistics, predictive analytics	20%	6
Unit III: AI and Machine Learning in Healthcare Machine learning basics, AI applications, clinical decision support	20%	6
Unit IV: Pharmaceutical and Clinical Analytics Pharmacovigilance analytics, clinical trial analytics, healthcare quality indicators	20%	6
Unit V: Digital Healthcare and Future Technologies Telemedicine, wearable technologies, healthcare big data, precision medicine	20%	6

	Practical	Weightage	Contact hours
	Appropriate laboratory experiments, demonstrations, and skill-based exercises related to the course contents shall be conducted to reinforce theoretical concepts and develop professional competencies.	100%	30

Instructional Method and Pedagogy:

Teaching through lectures, data analysis exercises and software-based learning.

Course Outcome:	Blooms' Taxonomy	Blooms' Taxonomy Sub
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		Domain	Domain
After successful completion of the above course, students will be able to:			
CO1	Explain healthcare analytics and data management systems.	Cognitive	Understand
CO2	Apply analytical tools and statistical methods in healthcare effectively.	Cognitive	Apply
CO3	Analyze healthcare datasets and trends critically.	Cognitive	Analyze
CO4	Interpret digital healthcare information and analytical outputs accurately.	Cognitive	Analyze
CO5	Demonstrate understanding of healthcare data analysis and decision-making systems.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Healthcare Analytics 2. Healthcare Data Analytics 3. Health Informatics 4. Bioinformatics and Computational Biology 5. Introduction to Health Care Management
2.	Reference Books 1. Artificial Intelligence in Healthcare 2. Biomedical Informatics 3. Data Analytics for Healthcare 4. Healthcare Information Systems 5. Medical Bioinformatics

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks
Practical Marks	Attendance	05 marks
	Practical Exam	20 marks
	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks
Project/ Industrial Internship Marks	Quantity of the Project/Industrial in terms of Language, Presentation & format.	20 marks
	Practical understanding of the subject on the Project/Industrial	10 marks
	Industry/ University mentor's feedback on the Project/ Industrial.	10 marks
	Attendance	10 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	1	1	1	1	2
CO2	2	2	2	1	1	2
CO3	2	3	2	2	2	3
CO4	2	3	2	2	2	3
CO5	2	2	3	3	2	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	1	1	1	1	2
CO2	2	2	2	1	1	2
CO3	2	3	2	2	2	3
CO4	2	3	2	2	2	3
CO5	2	2	3	3	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None



Teaching Scheme Semester –VI

Semester – VI							
Sr. No.	Course Code	Course Title	L	T	P	C	Marks
A. Major Course							
1	BMP0601	Clinical Pharmacy	3	0	0	3	100
2	BMP0602	Pharmaceutical Biotechnology	3	0	0	3	100
3	BMP0603	Pharmaceutical Quality Assurance	3	0	0	3	100
4	BMP0604	Pharmacology Lab	0	0	2	2	50
5	BMP0605	Pharmaceutics Lab	0	0	2	2	50
B. Minor Course							
6	BMP0606	Intellectual Property Rights	4	0	0	4	100
C. Skill Enhancement Course							
7	BMP0607	Internship – IV (Instrumentation Skills)	0	0	2	2	100
D. Interdisciplinary Course							
8	BMP0608	Start-up & Industry Interface	2	0	1	3	150
Total						20	750

COURSE CODE BMP0601	COURSE NAME CLINICAL PHARMACY	SEMESTER VI
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
45	0	0	45	3	0	0	3

Course Pre-requisites	Student should have cleared 12th Science		
Course Category	Mandatory Course		
Course focus	To develop clinical pharmacy and patient care competencies.		
Rationale	This course develops clinical knowledge for rational drug therapy, patient counseling, and pharmaceutical care practices.		
Course Revision/ Approval Date:	22/05/2026		
Course Objectives	After completion of the course, students will be able to:		
	CO1. Understand principles of clinical pharmacy. CO2. Explain patient counseling and medication management. CO3. Analyze drug therapy and interactions. CO4. Interpret clinical case studies. CO5. Apply pharmaceutical care in clinical practice.		
Course Content (Theory)		Weightage	Contact hours

Unit I: Introduction to Clinical Pharmacy Clinical pharmacy concepts, pharmaceutical care, hospital pharmacy services	20%	9
Unit II: Rational Drug Therapy Prescription analysis, dosage adjustments, drug interactions, medication errors	20%	9
Unit III: Clinical Pharmacokinetics and TDM Therapeutic drug monitoring, pharmacokinetic calculations, individualized therapy	20%	9
Unit IV: Adverse Drug Reactions and Pharmacovigilance ADR monitoring, pharmacovigilance systems, medication safety	20%	9
Unit V: Clinical and Community Pharmacy Practice Patient counseling, clinical case studies, evidence-based medicine	20%	9

Instructional Method and Pedagogy:

Teaching through clinical case studies, hospital training and therapeutic discussions.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain principles of clinical pharmacy and patient care.	Cognitive	Understand
CO2	Apply pharmaceutical care and therapeutic drug monitoring effectively.	Cognitive	Apply
CO3	Analyze medication therapy and	Cognitive	Analyze

	drug interactions critically.		
CO4	Interpret clinical case studies and treatment strategies accurately.	Cognitive	Analyze
CO5	Demonstrate clinical decision-making and patient counseling skills professionally.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Clinical Pharmacy and Therapeutics – Roger Walker 2. Textbook of Clinical Pharmacy Practice 3. Applied Therapeutics: Clinical Use of Drugs 4. Essentials of Medical Pharmacology – K.D. Tripathi 5. Pharmacotherapy Handbook
2.	Reference Books 1. Drug Information Handbook 2. Clinical Toxicology Manuals 3. Therapeutic Drug Monitoring 4. Hospital Pharmacy Practice 5. Clinical Case Studies 6. Indian pharmacopeia 7. Drug today

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case	10 marks

	study	
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	1	1	1	-
CO2	3	2	2	1	1	1
CO3	2	3	2	1	2	1
CO4	2	3	2	2	2	2
CO5	2	2	3	3	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	1	1	1	1	-
CO2	3	2	2	1	1	1
CO3	2	3	2	1	2	1
CO4	2	3	2	2	2	2
CO5	2	2	3	3	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0602	COURSE NAME PHARMACEUTICAL BIOTECHNOLOGY	SEMESTER VI
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Teaching Scheme (Hours)	Teaching Credit
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Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
45	0	0	45	3	0	0	3

Course Pre-requisites	Student should have cleared 12th Science					
Course Category	Mandatory Course					
Course focus	To understand biotechnology applications in pharmaceuticals and healthcare.					
Rationale	This course introduces biotechnological applications in drug development, diagnostics, vaccines, and therapeutics					
Course Revision/ Approval Date:	22/05/2026					
Course Objectives	After completion of the course, students will be able to:					
	CO1. Understand biotechnology principles in pharmaceuticals. CO2. Explain recombinant DNA and genetic engineering techniques. CO3. Analyze biopharmaceutical production processes. CO4. Interpret fermentation and cell culture systems. CO5. Apply biotechnology in drug development					
Course Content (Theory)				Weightage	Contact hours	
Unit I: Introduction to Biotechnology Biotechnology concepts, recombinant DNA technology, genetic engineering				20%	9	
Unit II: Cell and Tissue Culture Animal cell culture, stem cells, tissue engineering				20%	9	

Unit III: Biopharmaceuticals Vaccines, monoclonal antibodies, recombinant proteins, biosimilars	20%	9
Unit IV: Molecular Diagnostics and Bioinformatics PCR, DNA sequencing, molecular markers, bioinformatics applications	20%	9
Unit V: Advanced Pharmaceutical Biotechnology Gene therapy, nanobiotechnology, precision medicine, ethical issues	20%	9

Instructional Method and Pedagogy:

Teaching through lectures, biotechnology demonstrations and research-oriented learning.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain biotechnology principles and biopharmaceutical systems.	Cognitive	Understand
CO2	Apply recombinant DNA and fermentation technologies effectively.	Cognitive	Apply
CO3	Analyze biotechnological applications in healthcare and pharmaceuticals critically.	Cognitive	Analyze
CO4	Interpret bioprocessing and molecular biology systems accurately.	Cognitive	Analyze

CO5	Demonstrate understanding of biotechnology in pharmaceutical innovation.	Cognitive	Apply, Create
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Learning Resources	
1.	Textbooks 1. Pharmaceutical Biotechnology – Crommelin 2. Biotechnology and Biopharmaceuticals 3. Molecular Biotechnology 4. Genetic Engineering 5. Bioprocess Technology 6. Remington: The Sciences and practice of Pharmacy V-II
2.	Reference Books 1. Recombinant DNA Technology 2. Immunotechnology Manuals 3. Cell Culture Techniques 4. Fermentation Technology 5. Biotechnology Research Journals

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	1	-	-	2
CO2	3	2	2	1	-	2
CO3	2	3	3	1	1	2
CO4	2	2	3	2	1	3
CO5	2	2	3	2	2	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	1	1	-	-	2
CO2	3	2	2	1	-	2
CO3	2	3	3	1	1	2
CO4	2	2	3	2	1	3
CO5	2	2	3	2	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0603	COURSE NAME PHARMACEUTICAL QUALITY ASSURANCE	SEMESTER VI
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
45	0	0	45	3	0	0	3



Course Pre-requisites	Student should have cleared 12th Science		
Course Category	Mandatory Course		
Course focus	To understand quality systems, GMP and validation in pharmaceutical industries.		
Rationale	This course imparts knowledge regarding quality systems, GMP, validation, and regulatory compliance in pharmaceutical industries.		
Course Revision/ Approval Date:	22/05/2026		
Course Objectives	After completion of the course, students will be able to: CO1. Understand pharmaceutical quality assurance systems. CO2. Explain GMP, GLP and validation procedures. CO3. Analyze quality control and documentation practices. CO4. Interpret regulatory requirements in pharmaceutical industries. CO5. Apply quality management principles in manufacturing and testing.		
Course Content (Theory)		Weightage	Contact hours
Unit I: Quality Concepts and GMP Quality assurance, GMP guidelines, quality management systems		20%	9
Unit II: Validation and Documentation Process validation, cleaning validation, SOPs, documentation practices		20%	9
Unit III: Quality Control and Auditing QC tests, audits, inspection procedures, compliance management		20%	9

Unit IV: Regulatory and International Guidelines WHO, ICH, FDA, CDSCO guidelines, regulatory compliance	20%	9
Unit V: Risk Management and Pharmaceutical Quality Systems Risk assessment, CAPA, pharmaceutical quality systems	20%	9

Instructional Method and Pedagogy:

Teaching through lectures, biotechnology demonstrations and research-oriented learning.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain pharmaceutical quality assurance systems and GMP principles.	Cognitive	Understand
CO2	Apply quality control and validation procedures effectively.	Cognitive	Apply
CO3	Analyze quality management and compliance systems critically.	Cognitive	Analyze
CO4	Interpret pharmaceutical documentation and regulatory standards accurately.	Cognitive	Analyze
CO5	Demonstrate understanding of quality assurance practices in pharmaceutical industries.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Quality Assurance in Pharmaceutical Industry – Murray Cooper 2. Pharmaceutical Quality Assurance – P.P. Sharma 3. Good Manufacturing Practices for Pharmaceuticals 4. Quality Control and Industrial Pharmacy 5. Pharmaceutical Validation Principles
2.	Reference Books 1. WHO GMP Guidelines 2. USFDA Quality Assurance Manuals 3. ICH Quality Guidelines 4. Pharmaceutical Quality Systems 5. Validation and Regulatory Compliance Manuals

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	1	1	-	3	1
CO2	2	2	2	1	3	1
CO3	2	3	2	1	3	2
CO4	2	3	2	2	3	2
CO5	2	2	3	2	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	1	1	-	3	1
CO2	2	2	2	1	3	1
CO3	2	3	2	1	3	2
CO4	2	3	2	2	3	2
CO5	2	2	3	2	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE	COURSE NAME	SEMESTER VI
BMP0604	PHARMACOLOGY LAB	

Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
0	60	0	60	0	2	0	2

Course Pre-requisites	Student should have cleared 12th Science
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Course Category	Core Course
Course focus	To provide practical exposure to experimental pharmacology, drug screening and pharmacological calculations.
Rationale	This course provides practical training in pharmacological experiments, drug response studies, and experimental techniques.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand experimental pharmacology techniques. CO2. Explain drug action through laboratory experiments. CO3. Analyze pharmacological responses and effects. CO4. Interpret experimental observations and data. CO5. Apply ethical laboratory practices in pharmacology studies.

	Practical	Weightage	Contact hours
	Appropriate laboratory experiments, demonstrations, and skill-based exercises related to the course contents shall be conducted to reinforce theoretical concepts and develop professional competencies.	100%	60

Instructional Method and Pedagogy:

Experimental learning through laboratory practices and pharmacological demonstrations.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Perform basic experimental pharmacology techniques and laboratory procedures safely.	Cognitive Domain	Understand
CO2	Apply pharmacological principles to evaluate drug actions and responses experimentally.	Cognitive Domain	Apply
CO3	Analyze pharmacological effects, dose-response relationships and experimental data critically.	Cognitive Domain	Analyze
CO4	Interpret laboratory observations, biological responses and pharmacological calculations accurately.	Cognitive Domain	Analyze
CO5	Demonstrate ethical laboratory practices, scientific reporting and teamwork skills in pharmacology experiments.	Cognitive Domain	Apply, Create

Learning Resources

1.	Textbooks 1. Practical Pharmacology – Kulkarni 2. Experimental Pharmacology
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	3. Pharmacology Laboratory Manual 4. Clinical Pharmacology Experiments 5. Basic and Applied Pharmacology
2.	Reference Books 1. CPCSEA Guidelines 2. Pharmacology Practical Handbooks 3. Animal Handling and Ethics Manuals 4. Experimental Techniques in Pharmacology 5. Research Methodology in Pharmacology

Evaluation Scheme		Total Marks
Practical Marks	Attendance	05 marks
	Practical Exam	20 marks
	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	1	-	1	-
CO2	2	3	2	1	1	1
CO3	2	3	3	1	1	1
CO4	2	2	3	2	2	2
CO5	2	2	3	3	2	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
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CO1	2	3	1	-	1	-
CO2	2	3	2	1	1	1
CO3	2	3	3	1	1	1
CO4	2	2	3	2	2	2
CO5	2	2	3	3	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0605	COURSE NAME PHARMACEUTICS LAB	SEMESTER VI
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
0	60	0	60	0	2	0	2

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Core Course
Course focus	To develop practical skills in pharmaceutical formulation and evaluation techniques.
Rationale	This course develops formulation and evaluation skills for pharmaceutical dosage forms through laboratory practices.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand formulation and compounding techniques.

	CO2. Explain preparation of pharmaceutical dosage forms. CO3. Analyze formulation stability and compatibility. CO4. Interpret evaluation parameters of dosage forms. CO5. Apply pharmaceutical manufacturing techniques in laboratory settings.

	Practical	Weightage	Contact hours
	Appropriate laboratory experiments, demonstrations, and skill-based exercises related to the course contents shall be conducted to reinforce theoretical concepts and develop professional competencies.	100%	60

Instructional Method and Pedagogy:

Practical-oriented learning through formulation experiments and evaluation techniques.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Prepare pharmaceutical dosage forms using standard formulation methods.	Cognitive	Understand

CO2	Apply evaluation techniques for pharmaceutical formulations effectively.	Cognitive	Apply
CO3	Analyze formulation parameters and stability systems critically.	Cognitive	Analyze
CO4	Interpret formulation evaluation data accurately.	Cognitive	Analyze
CO5	Demonstrate practical formulation and compounding skills professionally.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Practical Pharmaceutical Chemistry 2. Aulton's Pharmaceutics
2.	Reference Books

Evaluation Scheme		Total Marks
Practical Marks	Attendance	05 marks
	Practical Exam	20 marks
	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	1	-	1	-



CO2	2	3	2	1	1	1
CO3	2	3	3	1	1	1
CO4	2	2	3	2	2	2
CO5	2	2	3	3	2	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	3	1	-	1	-
CO2	2	3	2	1	1	1
CO3	2	3	3	1	1	1
CO4	2	2	3	2	2	2
CO5	2	2	3	3	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0606	COURSE NAME INTELLECTUAL PROPERTY RIGHTS	SEMESTER VI
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
60	0	0	60	4	0	0	4

Course Pre-requisites	Student should have cleared 12th Science		
Course Category	Mandatory Course		
Course focus	To understand patents, copyrights and intellectual property systems.		
Rationale	This course explains intellectual property protection, patents, copyrights, and legal aspects of pharmaceutical innovation.		
Course Revision/ Approval Date:	22/05/2026		
Course Objectives	After completion of the course, students will be able to: CO1. Understand intellectual property rights and patent systems. CO2. Explain copyrights, trademarks and patent filing procedures. CO3. Analyze pharmaceutical patent regulations. CO4. Interpret legal and ethical aspects of IPR. CO5. Apply intellectual property concepts in research and innovation		
Course Content (Theory)		Weightage	Contact hours

Unit I: Introduction to Intellectual Property IPR concepts, types of intellectual property, patent systems	20%	12
Unit II: Pharmaceutical Patents Drug patents, process patents, product patents, patentability criteria	20%	12
Unit III: Copyrights, Trademarks and Designs Copyrights, trademarks, industrial designs, geographical indications	20%	12
Unit IV: Patent Filing and Documentation Patent search, patent drafting, filing procedures, patent databases	20%	12
Unit V: Regulatory and Ethical Aspects TRIPS agreement, ethics, infringement, innovation management	20%	12

Instructional Method and Pedagogy:

Experimental learning through laboratory practices and pharmacological demonstrations.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain intellectual property rights, patent systems and their importance in pharmaceutical sciences.	Cognitive Domain	Understand
CO2	Apply concepts of copyrights, trademarks and patent filing procedures effectively.	Cognitive Domain	Apply

CO3	Analyze pharmaceutical patent regulations, legal frameworks and innovation protection systems critically.	Cognitive Domain	Analyze
CO4	Interpret ethical and legal aspects of intellectual property rights in research and industry accurately.	Cognitive Domain	Analyze
CO5	Demonstrate understanding of intellectual property concepts for research, innovation and entrepreneurship development.	Cognitive Domain	Apply, Create

Learning Resources	
1.	Textbooks 1.Intellectual Property Rights – P. Narayanan 2.IPR in Pharmaceutical Industry 3.Patent Law and Practice 4.Intellectual Property and Innovation 5. Pharmaceutical Patent Protection
2.	Reference Books 1.Indian Patent Act 2.WIPO Guidelines 3.TRIPS Agreement Manuals 4.Copyright and Trademark Laws 5.Patent Filing and Drafting Manuals

Evaluation Scheme		Total Marks
Theory: Mid semester Marks		20 marks
Theory: End Semester		40 marks



Marks		
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks
Practical Marks	Attendance	05 marks
	Practical Exam	20 marks
	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks
Project/ Industrial Internship Marks	Quantity of the Project/Industrial in terms of Language, Presentation & format.	20 marks
	Practical understanding of the subject on the Project/Industrial	10 marks
	Industry/ University mentor's feedback on the Project/ Industrial.	10 marks
	Attendance	10 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	-	1	1	3	1
CO2	1	1	1	1	3	1

CO3	1	1	2	2	3	2
CO4	1	1	2	2	3	2
CO5	1	2	2	3	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	1	-	1	1	3	1
CO2	1	1	1	1	3	1
CO3	1	1	2	2	3	2
CO4	1	1	2	2	3	2
CO5	1	2	2	3	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0607	COURSE NAME INTERNSHIP – III (INSTRUMENTATION SKILLS)	SEMESTER VI
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
0	60	0	60	0	2	0	2

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Mandatory Course
Course focus	To provide industrial exposure in pharmaceutical analytical and quality systems.

Rationale	This course enhances industrial competency through practical exposure to pharmaceutical instrumentation and quality systems.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand principles of pharmaceutical instrumentation. CO2. Explain operation and maintenance of analytical instruments. CO3. Analyze pharmaceutical samples using modern instruments. CO4. Interpret instrument calibration and validation reports. CO5. Apply industrial analytical and instrumentation skills effectively

Instructional Method and Pedagogy:

Experiential learning through internships, industrial visits and laboratory training.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain principles, operation and applications of pharmaceutical analytical instruments.	Cognitive Domain	Understand

CO2	Apply instrument handling, calibration and maintenance procedures effectively in pharmaceutical laboratories.	Cognitive Domain	Apply
CO3	Analyze pharmaceutical samples using modern analytical instrumentation techniques critically.	Cognitive Domain	Analyze
CO4	Interpret calibration reports, validation records and quality control documentation accurately.	Cognitive Domain	Analyze
CO5	Demonstrate industrial analytical competency, professional ethics and instrumentation skills in pharmaceutical quality systems.	Cognitive Domain	Apply, Create

Learning Resources	
1.	Textbooks 1. Pharmaceutical Instrumentation 2. Practical Analytical Instrumentation 3. Instrumentation in Pharmaceutical Industry 4. Quality Control Laboratory Techniques 5. Analytical Method Validation
2.	Reference Books 1. Instrument Calibration Manuals 2. WHO Laboratory Guidelines 3. GMP and GLP Standards 4. Analytical Instrumentation Journals 5. Industrial Training Handbooks

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks
Practical Marks	Attendance	05 marks
	Practical Exam	20 marks
	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks
Project/ Industrial Internship Marks	Quantity of the Project/Industrial in terms of Language, Presentation & format.	20 marks
	Practical understanding of the subject on the Project/Industrial	10 marks
	Industry/ University mentor's feedback on the Project/ Industrial.	10 marks
	Attendance	10 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	1	-	1	-
CO2	2	3	2	1	1	1
CO3	2	3	3	1	1	1
CO4	2	2	3	2	2	2
CO5	2	2	3	3	2	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	3	1	-	1	-
CO2	2	3	2	1	1	1
CO3	2	3	3	1	1	1
CO4	2	2	3	2	2	2
CO5	2	2	3	3	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0608	COURSE NAME START-UP & INDUSTRY INTERFACE	SEMESTER VI
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
30	30	0	60	2	1	0	3

Course Pre-requisites	Student should have cleared 12th Science
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Course Category	Interdisciplinary Course	
Course focus	To develop industry interaction, startup development and innovation management skills in pharmaceutical and healthcare sectors.	
Rationale	This course bridges academic learning with industrial practices, innovation, entrepreneurship, and startup ecosystems.	
Course Revision/ Approval Date:	22/05/2026	
Course Objectives	After completion of the course, students will be able to: CO1. Understand startup ecosystems and industrial operations. CO2. Explain innovation and entrepreneurship in healthcare industries. CO3. Analyze business models and industrial practices. CO4. Interpret industry-academia collaboration frameworks. CO5. Apply entrepreneurial and professional skills in industrial environments.	
Course Content (Theory)		Contact hours
Unit I: Introduction to Start-up Ecosystem Startup ecosystem, innovation models, entrepreneurship opportunities		20% 6
Unit II: Pharmaceutical Industry Interface Industrial structure, pharmaceutical manufacturing, healthcare sectors		20% 6



Unit III: Business Development and Commercialization Business models, commercialization, product development, funding systems	20%	6
Unit IV: Regulatory and Legal Framework Regulatory approvals, IPR, patent systems, ethical practices	20%	6
Unit V: Industry Exposure and Future Trends Industry interaction, startup case studies, digital healthcare innovations	20%	6

Instructional Method and Pedagogy:

Teaching through industrial interactions, startup case studies and innovation activities.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain startup ecosystem and entrepreneurship concepts.	Cognitive	Understand
CO2	Analyze pharmaceutical industry structure and industrial practices.	Cognitive	Apply
CO3	Apply business development and commercialization strategies.	Cognitive	Analyze
CO4	Interpret regulatory and legal aspects relevant to startups.	Cognitive	Analyze
CO5	Demonstrate innovation and industry-oriented problem-solving skills.	Cognitive	Apply, Create



Learning Resources	
1.	Textbooks 1. Entrepreneurship and Startup Management 2. Industrial Management and Innovation 3. Pharmaceutical Industry Practices 4. Startup Strategies in Healthcare 5. Business Development and Leadership
2.	Reference Books 1. Innovation and Technology Management 2. Industrial Case Studies 3. Startup Ecosystem and Incubation 4. Pharmaceutical Entrepreneurship Journals 5. Industry-Academia Collaboration Manuals

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks
Practical Marks	Attendance	05 marks
	Practical Exam	20 marks
	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks



Project/ Industrial Internship Marks	Quantity of the Project/Industrial in terms of Language, Presentation & format.	20 marks
	Practical understanding of the subject on the Project/Industrial	10 marks
	Industry/ University mentor's feedback on the Project/ Industrial.	10 marks
	Attendance	10 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	-	1	2	1	2
CO2	1	1	1	2	1	2
CO3	1	1	2	3	2	3
CO4	1	1	2	3	2	3
CO5	1	2	2	3	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	1	-	1	2	1	2
CO2	1	1	1	2	1	2
CO3	1	1	2	3	2	3
CO4	1	1	2	3	2	3
CO5	1	2	2	3	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None





Teaching Scheme Semester –VII

Semester – VII							
Sr. No.	Course Code	Course Title	L	T	P	C	Marks
A. Major Course							
1	BMP0701	Advanced Medicinal Chemistry	4	0	0	4	100
2	BMP0702	Advanced Pharmacology	4	0	0	4	100
3	BMP0703	Industrial Pharmacy	3	0	0	3	100
B. Minor Course							
4	BMP0704	Pharmaceutical Marketing	4	0	0	4	100
C. Research							
5	BMP0705	Research Methodology	2	0	0	2	100
6	BMP0706 or 7	Research or Industry Project	0	0	4	4	100
Total						21	600

COURSE CODE BMP0701	COURSE NAME ADVANCED MEDICINAL CHEMISTRY	SEMESTER VII
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
60	0	0	60	4	0	0	4

Course Pre-requisites	Students should have successfully completed Medicinal Chemistry – I and Medicinal Chemistry – II courses.
Course Category	Mandatory Course
Course focus	To develop advanced understanding of drug design, molecular interactions and modern medicinal chemistry approaches.
Rationale	The course provides knowledge regarding advanced therapeutic agents, computational drug design and structure–activity relationships. It enables students to understand modern pharmaceutical research strategies and drug discovery processes.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand advanced drug design concepts and molecular targets. CO2. Explain computational and combinatorial chemistry approaches. CO3. Analyze structure–activity relationships of advanced therapeutics.

	CO4. Understand chemistry of biotechnology-derived drugs.	
	CO5. Apply medicinal chemistry principles in pharmaceutical research.	
Course Content (Theory)		Contact hours
Unit I: Advanced Drug Design Molecular docking, lead optimization, QSAR, computer-aided drug design		12
Unit II: Combinatorial and Green Chemistry Combinatorial chemistry, green synthesis, microwave-assisted synthesis		12
Unit III: Advanced Therapeutic Agents Peptide drugs, protein therapeutics, monoclonal antibodies		12
Unit IV: CNS and Cardiovascular Therapeutics Advanced CNS agents, cardiovascular drug targets, receptor interactions		12
Unit V: Emerging Trends in Medicinal Chemistry Nanomedicine, targeted drug delivery, precision medicine, pharmacogenomics		12

Instructional Method and Pedagogy:

Teaching through lectures, research article discussions and molecular modeling approaches

Course Outcome:	Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:		

CO1	Explain advanced concepts of medicinal chemistry and drug design.	Cognitive Domain	Understand
CO2	Analyze computational and combinatorial chemistry approaches.	Cognitive Domain	Analyze
CO3	Interpret chemistry and applications of advanced therapeutic agents.	Cognitive Domain	Apply
CO4	Evaluate molecular interactions of CNS and cardiovascular drugs.	Cognitive Domain	Evaluate
CO5	Apply emerging medicinal chemistry approaches in pharmaceutical research.	Cognitive Domain	Create

Learning Resources	
1.	Textbooks 1. Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry by John M. Beoale 2. Burger's Medicinal Chemistry and Drug Discovery 3. Medicinal Chemistry – Ashutosh Kar 4. Principles of Medicinal Chemistry – Foye 5. Drug Design: Structure and Ligand-Based Approaches
2.	Reference Books 1. Drug Design and Discovery 2. Computational Medicinal Chemistry 3. Heterocyclic Chemistry – Joule and Mills 4. Medicinal Chemistry Research Journals 5. QSAR and Molecular Modeling Manuals

Evaluation Scheme	Total Marks
Theory: Mid semester	20 marks

Marks		
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks
Practical Marks	Attendance	05 marks
	Practical Exam	20 marks
	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	1	-	-	1
CO2	3	2	2	1	-	2
CO3	2	3	2	1	1	2
CO4	2	3	3	2	1	2
CO5	2	2	3	2	2	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	1	1	-	-	1
CO2	3	2	2	1	-	2



CO3	2	3	2	1	1	2
CO4	2	3	3	2	1	2
CO5	2	2	3	2	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0702	COURSE NAME ADVANCED PHARMACOLOGY	SEMESTER VII
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
60	0	0	60	4	0	0	4

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Mandatory Course
Course focus	To understand advanced therapeutic systems and pharmacological research.
Rationale	This course develops advanced knowledge of pharmacological mechanisms, therapeutics, and clinical drug applications.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand advanced pharmacological mechanisms and therapeutic applications. CO2. Explain pharmacodynamics and pharmacokinetics of drugs.

	CO3. Analyze adverse drug reactions and toxicological effects. CO4. Interpret clinical pharmacology data and case studies. CO5. Apply pharmacological principles in patient care and research.	
Course Content (Theory)	Weightage	Contact hours
Unit I: Advanced Pharmacodynamics and Pharmacokinetics Receptor signaling, pharmacogenomics, therapeutic drug monitoring	20%	12
Unit II: Clinical Therapeutics Rational therapy, evidence-based medicine, personalized medicine	20%	12
Unit III: Neuropharmacology and Psychopharmacology Neurotransmitters, psychiatric disorders, advanced CNS therapeutics	20%	12
Unit IV: Immunopharmacology and Oncology Immunomodulators, anticancer pharmacology, targeted therapy	20%	12
Unit V: Experimental and Research Pharmacology Drug screening methods, preclinical studies, ethical regulations	20%	12

Instructional Method and Pedagogy:

Teaching through clinical discussions, case studies and research-oriented learning.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain advanced pharmacological mechanisms and receptor signaling.	Cognitive	Understand
CO2	Analyze principles of clinical therapeutics and personalized medicine.	Cognitive	Apply
CO3	Interpret neuropharmacological and psychopharmacological concepts.	Cognitive	Analyze
CO4	Evaluate immunopharmacology and anticancer therapeutics.	Cognitive	Analyze
CO5	Apply experimental pharmacology approaches in drug research.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Goodman and Gilman's Pharmacological Basis of Therapeutics 2. Katzung Basic and Clinical Pharmacology 3. Rang and Dale's Pharmacology 4. K.D. Tripathi Essentials of Medical Pharmacology 5. Clinical Pharmacology and Therapeutics
2.	Reference Books 1. Experimental Pharmacology Manuals 2. Clinical Case Studies in Pharmacology 3. Drug Interaction and Toxicology References 4. Pharmacotherapy Handbooks 5. Pharmacology Research Journals

Evaluation Scheme	Total Marks
Theory: Mid semester	20 marks



Marks		
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks
Practical Marks	Attendance	05 marks
	Practical Exam	20 marks
	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	1	-	-	1
CO2	3	2	2	1	1	1
CO3	2	3	2	1	1	2
CO4	2	3	2	2	2	2
CO5	2	2	3	2	2	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	1	1	-	-	1



CO2	3	2	2	1	1	1
CO3	2	3	2	1	1	2
CO4	2	3	2	2	2	2
CO5	2	2	3	2	2	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0703	COURSE NAME INDUSTRIAL PHARMACY	SEMESTER VII
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
45	0	0	45	3	0	0	3

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Mandatory Course
Course focus	To understand pharmaceutical industrial processes, scale-up techniques and industrial quality systems.
Rationale	This course explains pharmaceutical manufacturing, industrial processes, production technologies, and quality systems.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand pharmaceutical manufacturing and industrial operations. CO2. Explain formulation development and scale-up processes.

	CO3. Analyze production, packaging and quality assurance systems. CO4. Interpret GMP and industrial regulatory requirements. CO5.5. Apply industrial pharmacy principles in pharmaceutical production.	
Course Content (Theory)	Weightage	Contact hours
Unit I: Pharmaceutical Industry and GMP Pharmaceutical manufacturing systems, GMP, industrial organization	20%	9
Unit II: Scale-Up and Production Techniques Scale-up processes, pilot plant operations, industrial equipment	20%	9
Unit III: Industrial Formulation Development Tablet manufacturing, capsule production, sterile products	20%	9
Unit IV: Packaging and Validation Packaging systems, process validation, cleaning validation	20%	9
Unit V: Industrial Documentation and Regulatory Compliance Documentation systems, audits, WHO and FDA regulations	20%	9
Instructional Method and Pedagogy: Teaching through industrial case studies, lectures and process demonstrations.		

Course Outcome:	Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:		

CO1	Explain pharmaceutical industrial operations and GMP systems.	Cognitive	Understand
CO2	Analyze scale-up and production methodologies.	Cognitive	Apply
CO3	Apply industrial formulation and manufacturing concepts.	Cognitive	Analyze
CO4	Interpret packaging and validation procedures.	Cognitive	Analyze
CO5	Evaluate industrial documentation and regulatory compliance systems.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Industrial Pharmacy – Lachman and Lieberman 2. Aulton's Pharmaceutics 3. Modern Pharmaceutics 4. Pharmaceutical Technology 5. Remington: The Science and Practice of Pharmacy
2.	Reference Books 1. GMP Guidelines and Documentation Manuals 2. Pharmaceutical Production Technology 3. Pharmaceutical Packaging Technology 4. Validation in Pharmaceutical Industry 5. Industrial Pharmacy Journals

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component	Attendance	10 marks
	MCQs	10 marks



Marks	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	2	-	1	1
CO2	3	2	3	1	2	1
CO3	2	3	3	1	2	2
CO4	2	3	3	2	3	2
CO5	2	2	3	2	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	1	2	-	1	1
CO2	3	2	3	1	2	1
CO3	2	3	3	1	2	2
CO4	2	3	3	2	3	2
CO5	2	2	3	2	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0704	COURSE NAME PHARMACEUTICAL MARKETING	SEMESTER VII
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
60	0	0	60	4	0	0	4

Course Pre-requisites	Student should have cleared 12th Science		
Course Category	Mandatory Course		
Course focus	To develop knowledge regarding pharmaceutical marketing strategies, healthcare communication and product management.		
Rationale	This course introduces pharmaceutical marketing strategies, sales management, and healthcare business development.		
Course Revision/ Approval Date:	22/05/2026		
Course Objectives	After completion of the course, students will be able to:		
	CO1. Understand pharmaceutical marketing principles and strategies. CO2. Explain product management and healthcare marketing systems. CO3. Analyze consumer behavior and market research methods. CO4. Interpret sales promotion and distribution channels. CO5. 5. Apply marketing strategies in pharmaceutical industries.		
Course Content (Theory)		Weightage	Contact hours



Unit I: Principles of Pharmaceutical Marketing Marketing concepts, pharmaceutical market structure, marketing mix	20%	12
Unit II: Product and Brand Management Product lifecycle, branding, positioning, portfolio management	20%	12
Unit III: Sales and Distribution Management Sales strategies, distribution systems, supply chain management	20%	12
Unit IV: Digital and Healthcare Marketing Digital marketing, healthcare communication, CRM systems	20%	12
Unit V: Regulatory and Ethical Aspects in Marketing Ethical promotion, advertising regulations, pharmacoeconomics	20%	12

Instructional Method and Pedagogy:

Teaching through marketing case studies, presentations and group activities.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain principles of pharmaceutical marketing and management.	Cognitive	Understand
CO2	Analyze product branding and lifecycle strategies.	Cognitive	Apply
CO3	Apply sales and distribution management approaches.	Cognitive	Analyze
CO4	Interpret digital healthcare	Cognitive	Analyze



	marketing systems.		
CO5	Evaluate ethical and regulatory aspects of pharmaceutical marketing.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Pharmaceutical Marketing Management 2. Principles of Marketing – Philip Kotler 3. Healthcare and Pharmaceutical Marketing 4. Strategic Pharmaceutical Marketing 5. Marketing Management
2.	Reference Books 1. Pharmaceutical Sales and Distribution 2. Consumer Behaviour in Healthcare 3. Brand Management in Pharmaceuticals 4. Business Communication and Marketing 5. Pharmaceutical Industry Case Studies

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	-	1	2	1	1
CO2	1	1	1	3	1	2
CO3	1	1	2	3	2	2
CO4	1	1	2	3	2	2
CO5	1	2	2	3	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	1	-	1	2	1	1
CO2	1	1	1	3	1	2
CO3	1	1	2	3	2	2
CO4	1	1	2	3	2	2
CO5	1	2	2	3	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0705	COURSE NAME RESEARCH METHODOLOGY	SEMESTER VII
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
30	0	0	30	2	0	0	2

Course Pre-requisites	Student should have cleared 12th Science		
Course Category	Mandatory Course		
Course focus	To develop scientific research and experimental design skills.		
Rationale	This course develops scientific research skills, experimental design, statistical analysis, and scientific writing competencies		
Course Revision/ Approval Date:	22/05/2026		
Course Objectives	After completion of the course, students will be able to:		
	CO1. Understand principles and methods of scientific research. CO2. Explain research design, sampling and data collection techniques. CO3. Analyze statistical methods and data interpretation procedures. CO4. Interpret research ethics and scientific writing standards. CO5. 5. Apply research methodology in pharmaceutical and healthcare studies.		
Course Content (Theory)		Weightage	Contact hours
Unit I: Introduction to Research Research concepts, types of research, literature survey, hypothesis formulation		20%	6
Unit II: Research Design and Methodology Experimental design, sampling techniques, data collection methods		20%	6
Unit III: Statistical Methods and Data Analysis		20%	6

Biostatistics, hypothesis testing, interpretation of data		
Unit IV: Scientific Writing and Publication Ethics Research papers, plagiarism, citation methods, publication ethics	20%	6
Unit V: Intellectual Property and Research Funding Patents, research grants, proposal writing, innovation management	20%	6

Instructional Method and Pedagogy:

Teaching through research seminars, statistical exercises and scientific writing activities.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain principles and methodologies of scientific research.	Cognitive	Understand
CO2	Apply research design and data collection techniques.	Cognitive	Apply
CO3	Analyze research data using statistical approaches.	Cognitive	Analyze
CO4	Demonstrate scientific writing and publication ethics.	Cognitive	Analyze
CO5	Develop research proposals and innovation-oriented projects.	Cognitive	Apply, Create

Learning Resources



1.	Textbooks 1. Research Methodology – C.R. Kothari 2. Basic Concepts of Research and Biostatistics 3. Pharmaceutical Research Methodology 4. Research Design and Data Analysis 5. Scientific Writing and Research Ethics
2.	Reference Books 1. Biostatistics and Research Methods 2. Clinical Research Manuals 3. Research Publication Guidelines 4. Statistical Analysis Software Manuals 5. Journal Writing and Referencing Standards

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	1	1	2	1	2
CO2	2	2	2	2	1	2



C03	2	3	2	3	2	3
C04	2	3	2	3	2	3
C05	2	2	3	3	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
C01	2	1	1	2	1	2
C02	2	2	2	2	1	2
C03	2	3	2	3	2	3
C04	2	3	2	3	2	3
C05	2	2	3	3	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0706	COURSE NAME RESEARCH	SEMESTER VII
COURSE CODE BMP0707	COURSE NAME INDUSTRY PROJECT	SEMESTER VII

Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
0	120	0	120	0	4	0	4

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Mandatory Course
Course focus	To provide practical research and industrial problem-solving exposure.
Rationale	This course provides research and industrial exposure for solving practical pharmaceutical problems through project-based learning.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand research planning and industrial project execution. CO2. Explain experimental design and project management techniques. CO3. Analyze pharmaceutical and industrial research problems. CO4. Interpret scientific findings and project outcomes effectively.

	CO5. Apply research and industrial skills in solving practical pharmaceutical problems.

Instructional Method and Pedagogy:

Project-based learning through guided research, industrial training and presentations.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Identify and formulate pharmaceutical research problems.	Cognitive	Understand
CO2	Apply experimental and industrial methodologies in project work.	Cognitive	Apply
CO3	Analyze and interpret scientific or industrial data.	Cognitive	Analyze
CO4	Demonstrate technical writing and presentation skills.	Cognitive	Analyze
CO5	Develop research-oriented and industry-focused problem-solving abilities.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Pharmaceutical Research Projects Manual 2. Industrial Training and Research Methodology 3. Scientific Writing and Thesis Preparation 4. Applied Pharmaceutical Research

	5. Industrial Project Management
2.	Reference Books 1. Research Publication Ethics 2. Industrial Research Guidelines 3. WHO and ICH Research Standards 4. Pharmaceutical Innovation and Development 5. Scientific Communication Manuals

Evaluation Scheme		Total Marks
Project/ Industrial Internship Marks	Quantity of the Project/Industrial in terms of Language, Presentation & format.	20 marks
	Practical understanding of the subject on the Project/Industrial	10 marks
	Industry/ University mentor's feedback on the Project/ Industrial.	10 marks
	Attendance	10 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	1	1	1	2
CO2	2	3	2	2	1	3
CO3	2	3	3	2	2	3
CO4	2	3	3	3	2	3
CO5	2	2	3	3	3	3

Mapping of POs & COs



COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
C01	2	2	1	1	1	2
C02	2	3	2	2	1	3
C03	2	3	3	2	2	3
C04	2	3	3	3	2	3
C05	2	2	3	3	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None



Teaching Scheme Semester –VIII

Semester – VIII							
Sr. No.	Course Code	Course Title	L	T	P	C	Marks
A. Major Course							
1	BMP0801	Clinical Research & Pharmacovigilance	4	0	0	4	100
2	BMP0802	Advanced Pharmaceutical Analysis – I	4	0	0	4	100
3	BMP0803	Validation & Regulatory Compliance	3	0	0	3	100
B. Minor Course							
4	BMP0804	Financial Management	4	0	0	4	100
C. Research							
5	BMP0805 or 6	Research or Industry Project	0	0	6	6	100
Total						21	500

COURSE CODE BMP0801	COURSE NAME CLINICAL RESEARCH & PHARMACOVIGILANCE	SEMESTER VII
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
60	0	0	60	4	0	0	4

Course Pre-requisites	Students should have completed Pharmacology, Clinical Pharmacy and Research Methodology courses.
Course Category	Mandatory Course
Course focus	To develop understanding of clinical research processes, drug safety monitoring and pharmacovigilance systems.
Rationale	The course provides knowledge regarding clinical trial design, ethical practices and adverse drug reaction monitoring. It enables students to understand global pharmacovigilance systems and clinical research regulations.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand principles and phases of clinical research. CO2. Explain pharmacovigilance systems and ADR reporting. CO3. Analyze ethical and regulatory aspects of clinical trials.

	CO4. Interpret clinical data and safety monitoring procedures.	
	CO5. Apply pharmacovigilance concepts in healthcare and industry.	
Course Content (Theory)		Contact hours
Unit I: Introduction to Clinical Research Clinical research concepts, phases of clinical trials, GCP guidelines.		12
Unit II: Clinical Trial Design and Ethics Study design, informed consent, ethics committees, ICH guidelines.		12
Unit III : Pharmacovigilance Systems ADR reporting, signal detection, drug safety monitoring.		12
Unit IV: Clinical Data Management Data collection, case report forms, statistical interpretation.		12
Unit V: Regulatory and Global Perspectives CDSCO, USFDA, EMA regulations, post-marketing surveillance.		12

Instructional Method and Pedagogy:

Teaching through lectures, clinical case studies and pharmacovigilance reporting exercises.

Course Outcome:	Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:		

CO1	Explain principles and phases of clinical research.	Cognitive Domain	Understand
CO2	Analyze ethical and regulatory requirements of clinical trials.	Cognitive Domain	Analyze
CO3	Apply pharmacovigilance and ADR monitoring systems.	Cognitive Domain	Apply
CO4	Interpret clinical data management and reporting procedures.	Cognitive Domain	Analyze
CO5	Evaluate global drug safety and post-marketing surveillance systems.	Cognitive Domain	Evaluate

Learning Resources	
1.	Textbooks 1. Textbook of Clinical Research – David Machin 2. Principles of Clinical Research 3. Pharmacovigilance: Principles and Practice 4. Clinical Trials: A Practical Guide 5. Drug Safety Evaluation Methods 6. Clinical Pharmacy & Therapeutics
2.	Reference Books 1. ICH-GCP Guidelines 2. WHO Pharmacovigilance Guidelines 3. CDSCO Clinical Trial Regulations 4. Drug Safety Evaluation Manuals 5. Clinical Research Journals

Evaluation Scheme	Total Marks
Theory: Mid semester Marks	20 marks
Theory: End Semester Marks	40 marks



Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	1	1	1	2	1
CO2	2	2	2	1	2	2
CO3	2	3	2	2	2	3
CO4	2	3	2	2	3	3
CO5	2	2	3	3	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	1	1	1	2	1
CO2	2	2	2	1	2	2
CO3	2	3	2	2	2	3
CO4	2	3	2	2	3	3
CO5	2	2	3	3	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0802	COURSE NAME ADVANCED PHARMACEUTICAL	SEMESTER VIII
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	ANALYSIS –I	
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
60	0	0	60	4	0	0	4

Course Pre-requisites	Students should have cleared 12th Science
Course Category	Mandatory Course
Course focus	To provide advanced knowledge of modern analytical techniques and pharmaceutical quality analysis.
Rationale	This course develops advanced analytical and instrumental skills for pharmaceutical quality evaluation and research.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand advanced analytical instrumentation principles. CO2. Explain chromatographic and spectroscopic methods. CO3. Analyze pharmaceutical compounds using modern analytical techniques. CO4. Interpret analytical validation and quality control procedures. CO5. Apply instrumental methods in pharmaceutical research and industries.

Course Content (Theory)	Weightage	Contact hours
Unit I : Advanced Spectroscopy UV-Visible spectroscopy, IR spectroscopy, fluorescence spectroscopy.	20%	12
Unit II : Chromatographic Techniques HPLC, GC, TLC, ion-exchange chromatography.	20%	12
Unit III : Hyphenated and Bioanalytical Techniques LC-MS, GC-MS, bioanalytical methods, biomarker analysis.	20%	12
Unit IV : Analytical Validation and Quality Control Validation parameters, calibration, impurity profiling.	20%	12
Unit V: Pharmaceutical and Regulatory Applications Stability studies, dissolution testing, regulatory analytical requirements.	20%	12

Instructional Method and Pedagogy:

Teaching through analytical laboratory training and instrumental analysis sessions.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain principles of advanced pharmaceutical analytical techniques.	Cognitive	Understand

CO2	Analyze chromatographic and spectroscopic methods.	Cognitive	Apply
CO3	Apply advanced instrumental methods in pharmaceutical analysis.	Cognitive	Analyze
CO4	Interpret analytical validation and quality assurance procedures.	Cognitive	Analyze
CO5	Evaluate pharmaceutical analytical data and regulatory requirements.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Instrumental Methods of Chemical Analysis 2. Pharmaceutical Analysis 3. Textbook of Pharmaceutical Analysis 4. Analytical Chemistry 5. Practical Pharmaceutical Chemistry
2.	Reference Books 1. Modern Pharmaceutical Analysis 2. Vogel's Textbook of Quantitative Chemical Analysis 3. HPLC Practical and Industrial Applications 4. Mass Spectrometry for Pharmaceutical Analysis 5. Spectrometric Identification of Organic Compounds

Evaluation Scheme		Total Marks
Theory: Mid semester Marks		20 marks
Theory: End Semester Marks		40 marks



Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	1	-	1	1
CO2	3	3	2	1	1	2
CO3	2	3	3	1	2	2
CO4	2	3	3	2	2	2
CO5	2	3	3	2	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	2	1	-	1	1
CO2	3	3	2	1	1	2
CO3	2	3	3	1	2	2
CO4	2	3	3	2	2	2
CO5	2	3	3	2	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0803	COURSE NAME VALIDATION & REGULATORY COMPLIANCE	SEMESTER VIII
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
45	0	0	45	3	0	0	3

Course Pre-requisites	Students should have cleared 12th Science					
Course Category	Mandatory Course					
Course focus	To understand pharmaceutical validation and regulatory documentation systems.					
Rationale	This course explains validation processes, documentation systems, and international pharmaceutical regulatory requirements.					
Course Revision/ Approval Date:	22/05/2026					
Course Objectives	After completion of the course, students will be able to					
	CO1. Understand validation and regulatory compliance systems. CO2. Explain process validation and qualification procedures. CO3. Analyze documentation and quality management systems. CO4. Interpret national and international pharmaceutical regulations. CO5. Apply validation and compliance principles in pharmaceutical industries.					
Course Content (Theory)				Weightage	Contact hours	
Unit I: Introduction to Validation and Regulatory Systems				20%	9	
Concepts of validation, importance of validation in						



pharmaceutical industries, regulatory agencies, WHO, USFDA, CDSCO, ICH guidelines, quality assurance systems, GMP and GLP concepts		
Unit II: Qualification and Process Validation DQ, IQ, OQ, PQ, process validation, cleaning validation, analytical method validation, equipment qualification, validation master plan, calibration procedures	20%	9
Unit III: Documentation and Quality Management Systems SOP preparation, batch manufacturing records, batch packaging records, deviation handling, change control, CAPA, audit systems, documentation practices and data integrity	20%	9
Unit IV: Pharmaceutical Regulatory Compliance Regulatory filing systems, CTD and eCTD formats, drug approval procedures, regulatory inspections, compliance requirements for manufacturing and clinical research, stability documentation	20%	9
Unit V: International Regulatory Guidelines and Industrial Applications USFDA regulations, EMA guidelines, ICH quality guidelines, WHO-GMP requirements, pharmaceutical compliance audits, risk management, validation case studies and industrial applications	20%	9

Instructional Method and Pedagogy:

Teaching through lectures, industrial case studies and compliance exercises

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain pharmaceutical validation and regulatory compliance systems.	Cognitive	Understand
CO2	Apply validation protocols and regulatory documentation procedures effectively.	Cognitive	Apply
CO3	Analyze GMP, GLP and quality management systems critically.	Cognitive	Analyze
CO4	Interpret pharmaceutical regulatory guidelines and compliance standards accurately.	Cognitive	Analyze
CO5	Demonstrate understanding of validation and regulatory practices in pharmaceutical industries.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Pharmaceutical Validation 2. Validation Standard Operating Procedures 3. Good Manufacturing Practices 4. Pharmaceutical Quality Assurance 5. Regulatory Affairs from Wikipedia to Pharma
2.	Reference Books 1. WHO GMP Guidelines 2. ICH Quality Guidelines 3. FDA Guidance for Industry 4. Validation of Analytical Procedures 5. Quality Assurance of Pharmaceuticals



Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	1	1	1	3	1
CO2	2	2	2	1	3	1
CO3	2	3	2	2	3	2
CO4	2	3	2	2	3	2
CO5	2	2	3	3	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	1	1	1	3	1
CO2	2	2	2	1	3	1
CO3	2	3	2	2	3	2
CO4	2	3	2	2	3	2
CO5	2	2	3	3	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0804	COURSE NAME FINANCIAL MANAGEMENT	SEMESTER VIII
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
60	0	0	60	4	0	0	4

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Mandatory Course
Course focus	To understand financial planning and managerial accounting systems.
Rationale	This course develops financial planning, budgeting, accounting, and managerial decision-making skills.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to CO1. Understand principles of financial management and accounting. CO2. Explain budgeting, cost analysis and investment systems. CO3. Analyze financial statements and business performance. CO4. Interpret financial planning and decision-making processes. CO5. Apply financial management concepts in pharmaceutical industries



Course Content (Theory)	Weightage	Contact hours
Unit I: Introduction to Financial Management Principles and scope of financial management, objectives of financial management, financial planning, sources of finance, capital structure, functions of financial manager, time value of money	20%	9
Unit II: Accounting and Financial Statements Basics of accounting, journal, ledger, trial balance, preparation of balance sheet, profit and loss account, cash flow statement, ratio analysis and interpretation of financial statements	20%	9
Unit III: Budgeting and Cost Analysis Budgeting concepts, types of budgets, cost accounting, break-even analysis, marginal costing, cost-volume-profit analysis, budgeting for pharmaceutical industries	20%	9
Unit IV: Investment and Working Capital Management Capital budgeting techniques, payback period, net present value, internal rate of return, working capital management, inventory management, receivables and cash management	20%	9
Unit V: Financial Decision-Making and Risk Management Financial decision-making, risk and return analysis, financial forecasting, dividend policies, financial control systems, pharmaceutical business case studies and strategic financial management	20%	9

Instructional Method and Pedagogy:

Teaching through lectures, financial case studies and budgeting exercises.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain principles of financial management and accounting systems.	Cognitive	Understand
CO2	Apply budgeting, financial planning and investment concepts effectively.	Cognitive	Apply
CO3	Analyze financial statements and business performance critically.	Cognitive	Analyze
CO4	Interpret financial decision-making and risk management systems accurately.	Cognitive	Analyze
CO5	Demonstrate managerial and financial analytical skills in professional environments.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Financial Management 2. Financial Management: Theory and Practice 3. Principles of Management Accounting 4. Cost Accounting 5. Financial Accounting
2.	Reference Books 1. Management Accounting 2. Financial Management

	3. Fundamentals of Financial Management 4. Accounting for Management 5. Corporate Finance
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Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	CQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	-	1	2	1	1
CO2	1	1	1	3	1	1
CO3	1	1	2	3	2	2
CO4	1	1	2	3	2	2
CO5	1	2	2	3	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	1	-	1	2	1	1
CO2	1	1	1	3	1	1

CO3	1	1	2	3	2	2
CO4	1	1	2	3	2	2
CO5						

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0805	COURSE NAME INDUSTRIAL PROJECT	SEMESTER VIII
COURSE CODE BMP0806	COURSE NAME RESEARCH	SEMESTER VIII

Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
0	90	0	90	0	6	0	6

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Mandatory Course
Course focus	To provide practical exposure to pharmaceutical research, industrial problem-solving and innovation-based project work.
Rationale	This course strengthens research aptitude and industrial problem-solving abilities through practical project work.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand research planning and industrial project execution. CO2. Explain experimental design and project management techniques.

	CO3. Analyze pharmaceutical and industrial research problems.
	CO4. Interpret scientific findings and project outcomes effectively.
	CO5. Apply research and industrial skills in solving practical pharmaceutical problems.

Instructional Method and Pedagogy:

Project-based experiential learning through research work and industrial training.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Identify and formulate pharmaceutical research problems.	Cognitive	Understand
CO2	Apply experimental and industrial methodologies in project work.	Cognitive	Apply
CO3	Analyze and interpret scientific or industrial data.	Cognitive	Analyze
CO4	Demonstrate technical writing and presentation skills.	Cognitive	Analyze
CO5	Develop research-oriented and industry-focused problem-solving abilities.	Cognitive	Apply, Create

Learning Resources

1.	Textbooks 1. Pharmaceutical Research Projects Manual
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	2. Industrial Training and Research Methodology 3. Scientific Writing and Thesis Preparation 4. Applied Pharmaceutical Research 5. Industrial Project Management
2.	Reference Books 1. Research Publication Ethics 2. Industrial Research Guidelines 3. WHO and ICH Research Standards 4. Pharmaceutical Innovation and Development 5. Scientific Communication Manuals

Evaluation Scheme		Total Marks
Project/ Industrial Internship Marks	Quantity of the Project/Industrial in terms of Language, Presentation & format.	20 marks
	Practical understanding of the subject on the Project/Industrial	10 marks
	Industry/ University mentor's feedback on the Project/ Industrial.	10 marks
	Attendance	10 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	1	1	1	2
CO2	2	3	2	2	1	3
CO3	2	3	3	2	2	3
CO4	2	3	3	3	2	3



CO5	2	2	3	3	3	3
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Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	2	1	1	1	2
CO2	2	3	2	2	1	3
CO3	2	3	3	2	2	3
CO4	2	3	3	3	2	3
CO5	2	2	3	3	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None



Teaching Scheme Semester –IX

Semester – IX							
Sr. No.	Course Code	Course Title	L	T	P	C	Marks
A. Major Course							
1	BMP0901	Advanced Drug Delivery Systems	4	0	1	5	150
2	BMP0902	Nanotechnology & Novel Therapies	4	0	1	5	150
3	BMP0903	Ayurveda	5	0	0	5	100
4	BMP0904	Homeopathy	5	0	0	5	100
5	BMP0905	Advanced Pharmacokinetics	4	0	0	4	100
6	BMP0906	Advanced Pharmaceutical Analysis – I	2	0	2	4	150
B. Research							
7	BMP0907	Master's Research – II	0	0	4	4	100
Total						32	850

COURSE CODE BMP0901	COURSE NAME ADVANCED DRUG DELIVERY SYSTEMS	SEMESTER IX
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
60	30	0	90	4	1	0	5

Course Pre-requisites	Students should have completed Pharmaceutics, Biopharmaceutics and Pharmacokinetics courses.
Course Category	Core Course
Course focus	To develop advanced understanding of targeted and controlled drug delivery technologies used in modern pharmaceutical sciences.
Rationale	The course introduces advanced formulation approaches and novel drug delivery systems for improved therapeutic efficacy and patient compliance. It prepares students for industrial and research applications in modern pharmaceutics.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand principles of advanced drug delivery systems. CO2. Explain controlled and targeted drug delivery mechanisms.

	CO3. Analyze formulation strategies for novel delivery systems.	
	CO4. Interpret evaluation and characterization methods of advanced dosage forms.	
	CO5. Apply modern drug delivery approaches in pharmaceutical research.	
Course Content (Theory)	Weightage	Contact hours
Unit I: Fundamentals of Advanced Drug Delivery Controlled release systems, sustained release formulations, targeted delivery	20%	12
Unit II: Vesicular and Particulate Systems Liposomes, niosomes, microspheres, nanoparticles	20%	12
Unit III: Transdermal and Implantable Systems Transdermal patches, osmotic pumps, implants, bioadhesive systems	20%	12
Unit IV: Novel and Smart Drug Delivery Systems Pulsatile delivery, stimuli-responsive systems, gene delivery	20%	12
Unit V: Evaluation and Regulatory Aspects Characterization methods, stability studies, regulatory requirements	20%	12

	Practical	Weightage	Contact hours
	Appropriate laboratory experiments, demonstrations, and skill-based exercises related to the course contents shall be conducted to reinforce theoretical concepts and develop professional competencies.	100%	30

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Instructional Method and Pedagogy:

Teaching through lectures, formulation demonstrations and research-oriented discussions.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain principles of advanced drug delivery systems.	Cognitive Domain	Understand
CO2	Analyze formulation approaches for targeted drug delivery.	Cognitive Domain	Analyze
CO3	Apply novel pharmaceutical technologies in dosage form development.	Cognitive Domain	Apply
CO4	Interpret characterization and evaluation methods of advanced formulations.	Cognitive Domain	Analyze
CO5	Evaluate industrial and regulatory aspects of advanced drug delivery systems.	Cognitive Domain	Evaluate

Learning Resources	
1.	Textbooks 1. Novel Drug Delivery Systems – Y.W. Chien 2. Controlled Drug Delivery Concepts and Advances 3. Drug Delivery and Targeting 4. Advanced Pharmaceutics and Drug Delivery

	5. Modern Pharmaceutics 6. Aulton's Pharmaceutics
2.	Reference Books 1. Nanocarrier Drug Delivery Systems 2. Transdermal and Targeted Drug Delivery 3. Pharmaceutical Technology Journals 4. Controlled Release Formulation Manuals 5. Biopharmaceutics and Drug Delivery Research Papers

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	2	-	1	1
CO2	3	2	3	1	1	2
CO3	2	3	3	1	2	2
CO4	2	3	3	2	2	2
CO5	2	2	3	2	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	1	2	-	1	1
CO2	3	2	3	1	1	2
CO3	2	3	3	1	2	2
CO4	2	3	3	2	2	2
CO5	2	2	3	2	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0902	COURSE NAME NANOTECHNOLOGY & NOVEL THERAPIES	SEMESTER IX
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
60	30	0	90	4	1	0	5

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Mandatory Course
Course focus	To understand nanotechnology applications and emerging therapeutic approaches in pharmaceutical sciences.
Rationale	The course introduces nanosystems and advanced therapeutic technologies used in diagnostics, drug delivery and personalized medicine. It prepares students for modern pharmaceutical and biomedical research.



Course Revision/ Approval Date:	22/05/2026		
Course Objectives	After completion of the course, students will be able to: CO1. Understand fundamentals of pharmaceutical nanotechnology. CO2. Explain nanosystems and nanocarrier-based therapies. CO3. Analyze applications of nanotechnology in diagnostics and therapeutics. CO4. Interpret novel therapeutic strategies and biomedical innovations. CO5. Apply nanotechnology concepts in pharmaceutical research.		
Course Content (Theory)	Weightage	Contact hours	
Unit I: Fundamentals of Nanotechnology Nanoparticles, nanocarriers, nanoscale properties, nanomaterials	20%	12	
Unit II: Nanotechnology in Drug Delivery Polymeric nanoparticles, dendrimers, nanocapsules, targeted delivery	20%	12	
Unit III: Nanodiagnostics and Biomedical Applications Biosensors, imaging systems, nanodiagnostics, theranostics	20%	12	
Unit IV: Novel Therapeutic Approaches Gene therapy, stem cell therapy, immunotherapy, precision medicine	20%	12	
Unit V: Safety, Ethics and Regulatory Aspects Nanotoxicology, ethical considerations, regulatory	20%	12	

requirements		
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	Practical	Weightage	Contact hours
	Appropriate laboratory experiments, demonstrations, and skill-based exercises related to the course contents shall be conducted to reinforce theoretical concepts and develop professional competencies.	100%	30

Instructional Method and Pedagogy:

Teaching through lectures, nanotechnology case studies and interdisciplinary learning.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain nanotechnology concepts and novel therapeutic approaches in healthcare.	Cognitive	Understand
CO2	Apply nanocarrier systems and targeted therapies in pharmaceutical sciences effectively.	Cognitive	Apply
CO3	Analyze nanomedicine applications and advanced therapeutic systems critically.	Cognitive	Analyze
CO4	Interpret nano formulation characterization and biomedical applications accurately.	Cognitive	Analyze

CO5	Demonstrate understanding of nanotechnology-based pharmaceutical innovation and precision medicine.	Cognitive	Apply, Create
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Learning Resources	
1.	Textbooks 1. Pharmaceutical Nanotechnology 2. Nanomedicine and Drug Delivery 3. Nanotechnology in Healthcare 4. Targeted Drug Delivery and Nanocarriers 5. Novel Therapies in Pharmaceutical Sciences 6. Pharmaceutical Biotechnology
2.	Reference Books 1. Nanobiotechnology Manuals 2. Bioinformatics 3. Advanced Therapeutic Systems 4. Gene and Cell Therapy Journals 5. Biomedical Nanotechnology Research 6. Precision Medicine and Diagnostics

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks



Practical Marks	Attendance	05 marks
	Practical Exam	20 marks
	Viva	10 marks
	Journal	10 marks
	Discipline	05 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	2	-	1	2
CO2	3	2	3	1	1	2
CO3	2	3	3	1	2	3
CO4	2	3	3	2	2	3
CO5	2	2	3	2	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	1	2	-	1	2
CO2	3	2	3	1	1	2
CO3	2	3	3	1	2	3
CO4	2	3	3	2	2	3
CO5	2	2	3	2	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0903	COURSE NAME AYURVEDA	SEMESTER IX
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
75	0	0	75	5	0	0	5

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Core Course
Course focus	To understand principles of Ayurveda and their applications in healthcare and pharmaceutical sciences
Rationale	The course introduces traditional Indian medicinal systems and herbal therapeutic concepts. It enables students to understand integrative healthcare and evidence-based traditional medicine applications.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand principles and philosophy of Ayurveda. CO2. Explain Ayurvedic concepts of health and disease. CO3. Analyze medicinal plants and Ayurvedic formulations. CO4. Interpret therapeutic applications of Ayurveda.

	CO5. Evaluate integrative approaches in healthcare systems.	
Course Content (Theory)	Weightage	Contact hours
Unit I Fundamentals of Ayurveda History, principles, tridosha theory, prakriti concepts	20%	15
Unit II: Ayurvedic Pharmacology Dravyaguna, rasa, virya, vipaka, medicinal plants	20%	15
Unit III: Ayurvedic Formulations Churna, asava, arishta, bhasma, herbal formulations	20%	15
Unit IV Therapeutics and Panchakarma Disease management, detoxification therapies, wellness concepts	20%	15
Unit V: Modern Applications and Standardization Modern Applications and Standardization	20%	15

Instructional Method and Pedagogy:

Teaching through lectures, medicinal plant studies and traditional healthcare discussions.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain principles and philosophy of Ayurvedic healthcare systems.	Cognitive	Understand
CO2	Apply knowledge of Ayurvedic formulations and herbal therapeutics	Cognitive	Apply

	effectively.		
CO3	Analyze medicinal plants and traditional treatment approaches critically.	Cognitive	Analyze
CO4	Interpret Ayurvedic concepts related to preventive and holistic healthcare accurately.	Cognitive	Analyze
CO5	Demonstrate understanding of traditional Indian medicinal systems and herbal pharmaceutical practices.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Fundamentals of Ayurveda 2. Ayurvedic Pharmacology and Therapeutics 3. Dravyaguna Vigyan 4. Principles of Ayurvedic Medicine 5. Textbook of Ayurvedic Pharmacy 6. Herbal Drug Technology
2.	Reference Books 1. Charaka Samhita 2. Sushruta Samhita 3. Pharmacognosy 4. Ayurvedic Formulation Manuals 5. Herbal Medicine and Natural Products 6. WHO Guidelines on Traditional Medicine

Evaluation Scheme		Total Marks
Theory: Mid semester Marks		20 marks
Theory: End Semester		40 marks

Marks		
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	1	2	-	2	1
CO2	2	1	3	1	2	1
CO3	2	2	3	1	2	2
CO4	2	2	3	2	3	2
CO5	2	2	3	2	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	1	2	-	2	1
CO2	2	1	3	1	2	1
CO3	2	2	3	1	2	2
CO4	2	2	3	2	3	2
CO5	2	2	3	2	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0904	COURSE NAME HOMEOPATHY	SEMESTER IX
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
75	0	0	75	5	0	0	5

Course Pre-requisites	Students should have completed Pharmaceutics, Biopharmaceutics and Pharmacokinetics courses.
Course Category	Core Course
Course focus	To understand principles of homeopathy and alternative therapeutic systems in healthcare sciences.
Rationale	The course introduces homeopathic philosophy, preparation methods and therapeutic concepts. It develops understanding of complementary and alternative medicine approaches in healthcare.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand principles and philosophy of homeopathy. CO2. Explain preparation and potentization methods. CO3. Analyze homeopathic materia medica and therapeutics. CO4. Interpret homeopathic case-taking procedures. CO5. Evaluate complementary healthcare approaches.

Course Content (Theory)	Weightage	Contact hours
Unit I: Fundamentals of Homeopathy History, principles, law of similar, vital force theory	20%	15
Unit II: Homeopathic Pharmacy Drug preparation, potentization, dosage forms	20%	15
Unit III: Materia Medica Common remedies, therapeutic indications, constitutional remedies	20%	15
Unit IV: Homeopathic Therapeutics Case taking, chronic diseases, acute disorders	20%	15
Unit V Modern Perspectives and Regulations Integrative medicine, ethical issues, regulatory aspects	20%	15

Instructional Method and Pedagogy:

. Teaching through lectures, remedy analysis and case-based discussions.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain principles and philosophy of homeopathic systems of medicine.	Cognitive	Understand
CO2	Apply homeopathic concepts in complementary healthcare approaches effectively.	Cognitive	Apply
CO3	Analyze preparation and therapeutic applications of homeopathic remedies critically.	Cognitive	Analyze

CO4	Interpret homeopathic treatment approaches and healthcare principles accurately.	Cognitive	Analyze
CO5	Demonstrate understanding of alternative healthcare systems and homeopathic therapeutics.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Principles and Practice of Homeopathy 2. Homeopathic Pharmacy 3. Organon of Medicine 4. Homeopathic Materia Medica 5. Fundamentals of Homeopathic Therapeutics
2.	Reference Books 1. Boericke's Materia Medica 2. Kent's Repertory 3. Homeopathic Drug Preparation Manuals 4. Complementary and Alternative Medicine 5. Research in Homeopathic Medicine 6. National Commission for Homoeopathy Guidelines

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component Marks	Attendance	10 marks
	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks



	Total	40 Marks
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Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	1	2	-	2	1
CO2	2	1	3	1	2	1
CO3	2	2	3	1	2	2
CO4	2	2	3	2	3	2
CO5	2	2	3	2	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	1	2	-	2	1
CO2	2	1	3	1	2	1
CO3	2	2	3	1	2	2
CO4	2	2	3	2	3	2
CO5	2	2	3	2	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0905	COURSE NAME ADVANCED PHARMACOKINETICS	SEMESTER IX
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
60	0	0	60	4	0	0	4

Course Pre-requisites	Students should have completed Pharmaceutics, Biopharmaceutics and Pharmacokinetics courses.
Course Category	Core Course
Course focus	To develop advanced understanding of pharmacokinetic modeling and drug disposition processes.
Rationale	The course provides knowledge regarding advanced pharmacokinetic principles and mathematical modeling used in dosage regimen design and therapeutic monitoring.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand advanced pharmacokinetic concepts and models. CO2. Explain compartmental and non-compartmental analysis. CO3. Analyze drug absorption, distribution and elimination processes. CO4. Interpret pharmacokinetic data and dosage regimen calculations.

	CO5. Apply pharmacokinetic principles in clinical therapeutic	
Course Content (Theory)	Weightage	Contact hours
Unit I: Fundamentals of Advanced Pharmacokinetics ADME principles, compartment models, nonlinear kinetics	20%	12
Unit II: Drug Absorption and Distribution Models Bioavailability, tissue distribution, protein binding	20%	12
Unit III: Drug Metabolism and Elimination Hepatic clearance, renal elimination, enzyme kinetics	20%	12
Unit IV: Pharmacokinetic Modeling and Simulation Mathematical models, dosage calculations, simulation software	20%	12
Unit V Clinical Pharmacokinetics Therapeutic drug monitoring, individualized therapy, PK-PD relationships	20%	12
Instructional Method and Pedagogy: Teaching through numerical exercises, simulations and clinical pharmacokinetic discussions.		

Course Outcome:	Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:		
CO1	Explain advanced pharmacokinetic and pharmacodynamic principles.	Cognitive Domain Understand

CO2	Apply compartmental modeling and dosage regimen calculations effectively.	Cognitive Domain	Analyze
CO3	Analyze ADME processes and bioavailability studies critically.	Cognitive Domain	Apply
CO4	Interpret pharmacokinetic data and simulation models accurately.	Cognitive Domain	Analyze
CO5	Demonstrate understanding of clinical pharmacokinetic applications and therapeutic optimization.	Cognitive Domain	Evaluate

Learning Resources	
1.	Textbooks 1. Clinical Pharmacokinetics – Rowland and Tozer 2. Biopharmaceutics and Pharmacokinetics – Brahmankar 3. Applied Pharmacokinetics and Pharmacodynamics 4. Pharmacokinetic Modeling and Simulation 5. Advanced Clinical Pharmacokinetics
2.	Reference Books 1. Bioavailability and Bioequivalence Studies 2. PK/PD Modeling Manuals 3. Therapeutic Drug Monitoring Journals 4. Clinical Drug Interaction References 5. Pharmacometric Analysis Guides

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous Evaluation Component	Attendance	10 marks
	MCQs	10 marks



Marks	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	1	-	1	2
CO2	3	2	2	1	1	2
CO3	2	3	2	1	2	3
CO4	2	3	2	2	2	3
CO5	2	2	3	2	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	1	1	-	1	2
CO2	3	2	2	1	1	2
CO3	2	3	2	1	2	3
CO4	2	3	2	2	2	3
CO5	2	2	3	2	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

COURSE CODE BMP0906	COURSE NAME MASTER'S RESEARCH - II	SEMESTER IX
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
30	60	0	90	2	2	0	4

Course Pre-requisites	Student should have cleared 12th Science		
Course Category	Core Course		
Course focus	To provide advanced practical and theoretical knowledge of pharmaceutical analytical instrumentation and validation systems		
Rationale	This course enhances analytical proficiency in modern pharmaceutical testing and instrumental techniques		
Course Revision/ Approval Date:	22/05/2026		
Course Objectives	After completion of the course, students will be able to: CO1. Understand advanced analytical instrumentation and techniques. CO2. Explain chromatographic and spectroscopic methods in pharmaceutical analysis. CO3. Analyze pharmaceutical formulations and biological samples. CO4. Interpret analytical validation and quality assurance procedures. CO5. Apply advanced analytical techniques in research and pharmaceutical industries.		
Course Content (Theory)		Weightage	Contact hours
Unit I: Advanced Spectroscopic Techniques UV, IR, fluorescence, NMR fundamentals		20%	6

Unit II: Advanced Chromatographic Techniques HPLC, GC, HPTLC, LC-MS applications	20%	6
Unit III: Bioanalytical and Hyphenated Techniques Bioanalysis, mass spectrometry, impurity profiling	20%	6
Unit IV: Validation and Regulatory Analysis Analytical validation, calibration, documentation	20%	6
Unit V: Industrial Applications Pharmaceutical QC, stability studies, dissolution analysis	20%	6

	Practical	Weightage	Contact hours
	Appropriate laboratory experiments, demonstrations, and skill-based exercises related to the course contents shall be conducted to reinforce theoretical concepts and develop professional competencies.	100%	60

Instructional Method and Pedagogy:

Teaching through laboratory experimentation and analytical instrument training.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain advanced pharmaceutical analytical and instrumental techniques.	Cognitive	Understand
CO2	Apply chromatographic and	Cognitive	Apply

	spectroscopic methods in pharmaceutical analysis effectively.		
CO3	Analyze pharmaceutical formulations and analytical data critically.	Cognitive	Analyze
CO4	Interpret analytical validation and quality assurance parameters accurately.	Cognitive	Analyze
CO5	Demonstrate advanced analytical and instrumentation skills in pharmaceutical research and quality control.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Instrumental Methods of Analysis – Skoog 2. Pharmaceutical Analysis – Beckett and Stenlake 3. Modern Analytical Chemistry 4. Spectroscopic and Chromatographic Analysis 5. Pharmaceutical Quality Control
2.	Reference Books 1. USP, BP and IP Analytical Standards 2. HPLC and GC Operational Manuals 3. Analytical Method Validation Guidelines 4. Pharmaceutical Analytical Journals 5. Advanced Instrumentation Research Manuals

Evaluation Scheme		Total Marks
Theory: Mid semester Marks	20 marks	
Theory: End Semester Marks	40 marks	
Theory: Continuous	Attendance	10 marks



Evaluation Component Marks	MCQs	10 marks
	Skill enhancement activities / case study	10 marks
	Presentation/ miscellaneous activities	10 marks
	Total	40 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	1	-	1	1
CO2	3	3	2	1	1	2
CO3	2	3	3	1	2	2
CO4	2	3	3	2	2	2
CO5	2	3	3	2	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	2	1	-	1	1
CO2	3	3	2	1	1	2
CO3	2	3	3	1	2	2
CO4	2	3	3	2	2	2
CO5	2	3	3	2	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
0	120	0	120	0	4	0	4

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Mandatory Course
Course focus	To provide practical exposure to pharmaceutical research, industrial problem-solving and innovation-based project work.
Rationale	This course enhances analytical proficiency in modern pharmaceutical testing and instrumental techniques.
Course Revision/ Approval Date:	22/05/2026
Course Objectives	After completion of the course, students will be able to: CO1. Understand research planning and industrial project execution. CO2. Explain experimental design and project management techniques. CO3. Analyze pharmaceutical and industrial research problems. CO4. Interpret scientific findings and project outcomes effectively. CO5. Apply research and industrial skills in solving practical pharmaceutical problems.

Instructional Method and Pedagogy:

The project work will be conducted through supervised laboratory research, industrial exposure, project-based learning and guided mentoring. Students will prepare technical reports, presentations and scientific documentation based on research findings or industrial assignments.

Course Outcome:	Blooms' Taxonomy	Blooms' Taxonomy Sub
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		Domain	Domain
After successful completion of the above course, students will be able to:			
CO1	Explain research objectives, methodology and scientific approaches related to the selected research topic.	Cognitive	Understand
CO2	Apply advanced research techniques and experimental methods effectively in pharmaceutical sciences.	Cognitive	Apply
CO3	Analyze experimental observations and research data critically.	Cognitive	Analyze
CO4	Interpret scientific findings and prepare research documentation accurately.	Cognitive	Analyze
CO5	Demonstrate independent research aptitude, scientific writing and innovation skills professionally.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Pharmaceutical Research Projects Manual 2. Industrial Training and Research Methodology 3. Scientific Writing and Thesis Preparation 4. Applied Pharmaceutical Research 5. Industrial Project Management
2.	Reference Books 1. Research Publication Ethics 2. Industrial Research Guidelines 3. WHO and ICH Research Standards 4. Pharmaceutical Innovation and Development

	5. Scientific Communication Manuals
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Evaluation Scheme		Total Marks
Project/ Industrial Internship Marks	Quantity of the Project/Industrial in terms of Language, Presentation & format.	20 marks
	Practical understanding of the subject on the Project/Industrial	10 marks
	Industry/ University mentor's feedback on the Project/ Industrial.	10 marks
	Attendance	10 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	1	1	1	3
CO2	2	3	2	2	1	3
CO3	2	3	3	2	2	3
CO4	2	3	3	3	2	3
CO5	2	2	3	3	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	2	1	1	1	3
CO2	2	3	2	2	1	3
CO3	2	3	3	2	2	3
CO4	2	3	3	3	2	3
CO5	2	2	3	3	3	3



1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None

Teaching Scheme Semester – X

Semester – X							
Sr. No.	Course Code	Course Title	L	T	P	C	Marks
A. Major Course							
1	BMP1001	Comprehensive Viva	0	0	5	5	100
B. Research							
2	BMP1002	Master's Research – II	0	0	4	4	100
Total						09	200

COURSE CODE BMP1001	COURSE NAME COMPREHENSIVE VIVA	SEMESTER X
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
0	10	0	10	0	5	0	5

COURSE CODE BMP1002	COURSE NAME MASTER'S RESEARCH - II	SEMESTER X
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Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total Hours	Lecture	Practical	Tutorial	Total Credit
0	8	0	8	0	4	0	4

Course Pre-requisites	Student should have cleared 12th Science
Course Category	Mandatory Course
Course focus	To provide practical exposure to pharmaceutical research, industrial problem-solving and innovation-based project work.
Rationale	This course enhances analytical proficiency in modern pharmaceutical testing and instrumental techniques.
Course Revision/ Approval Date:	22/05/2026
	After completion of the course, students will be able

Course Objectives	to:
	CO6. Understand research planning and industrial project execution. CO7. Explain experimental design and project management techniques. CO8. Analyze pharmaceutical and industrial research problems. CO9. Interpret scientific findings and project outcomes effectively. CO10. Apply research and industrial skills in solving practical pharmaceutical problems.

Instructional Method and Pedagogy:

The project work will be conducted through supervised laboratory research, industrial exposure, project-based learning and guided mentoring. Students will prepare technical reports, presentations and scientific documentation based on research findings or industrial assignments.

Course Outcome:		Blooms' Taxonomy Domain	Blooms' Taxonomy Sub Domain
After successful completion of the above course, students will be able to:			
CO1	Explain research objectives, methodology and scientific approaches related to the selected research topic.	Cognitive	Understand
CO2	Apply advanced research techniques and experimental methods effectively in pharmaceutical sciences.	Cognitive	Apply
CO3	Analyze experimental observations	Cognitive	Analyze

	and research data critically.		
CO4	Interpret scientific findings and prepare research documentation accurately.	Cognitive	Analyze
CO5	Demonstrate independent research aptitude, scientific writing and innovation skills professionally.	Cognitive	Apply, Create

Learning Resources	
1.	Textbooks 1. Pharmaceutical Research Projects Manual 2. Industrial Training and Research Methodology 3. Scientific Writing and Thesis Preparation 4. Applied Pharmaceutical Research 5. Industrial Project Management
2.	Reference Books 1. Research Publication Ethics 2. Industrial Research Guidelines 3. WHO and ICH Research Standards 4. Pharmaceutical Innovation and Development 5. Scientific Communication Manuals

Evaluation Scheme		Total Marks
Project/ Industrial Internship Marks	Quantity of the Project/Industrial in terms of Language, Presentation & format.	20 marks
	Practical understanding of the subject on the Project/Industrial	10 marks
	Industry/ University mentor's feedback on the Project/ Industrial.	10 marks
	Attendance	10 marks
	Total	50 Marks

Mapping of PSOs & COs

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	1	1	1	3
CO2	2	3	2	2	1	3
CO3	2	3	3	2	2	3
CO4	2	3	3	3	2	3
CO5	2	2	3	3	3	3

Mapping of POs & COs

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	2	1	1	1	3
CO2	2	3	2	2	1	3
CO3	2	3	3	2	2	3
CO4	2	3	3	3	2	3
CO5	2	2	3	3	3	3

1: Slight (low); 2: Moderate (Medium); 3: Substantial (High); - None