



**CHARUSAT**  
CHAROTAR UNIVERSITY OF SCIENCE AND TECHNOLOGY

**STUDENT INFORMATION  
BOOKLET FOR THE  
ACADEMIC YEAR 2025-26  
VOLUME – 2 : M.Pharm (Pharmaceutical  
Chemistry)**

**Ramanbhai Patel College of Pharmacy**

**CHARUSAT UNIVERSITY**  
Off. Nadiad-Petlad Highway, Changa - 388 421  
Anand, Gujarat, India

# CONTENT

<b>Sr. No.</b>	<b>Description</b>	<b>Pg. No.</b>
	Preamble	3
	About the Institute	4
<b>1</b>	<b>PROGRAMME SPECIFIC</b>	
1.1	Academic Regulations	6
1.2	Programme Structure (Teaching & Examination Scheme)	6
1.3	Learning Resources	82
1.4	Academic Calendar	83
<b>2</b>	<b>VARIOUS ADMINISTRATIVE PROCESS</b>	88
2.1	Payment of tuition fees or Other charges	89
2.2	Process of Acquiring WIFI access	90
2.3	Process to obtain required Certificate from the institute	91
2.4	Process to obtain required Certificate from the university office	92
2.5	Process to obtain Duplicate Grade Card / Name Correction in Grade Card	93
2.6	Process to obtain Migration Certificate	93
2.7	Process for Academic Document Verification by External Agency	93
2.8	Process for acquiring Transcript OR E-transcript	94
<b>3</b>	<b>FORMS FOR UNDERTAKINGS &amp; DECLARATIONS</b>	96
3.1	Undertaking for Observing Rules and Regulations of the university	97
3.2	Declaration for Code of Conducts & Disciplinary Rules	98
3.3	Undertaking for Examination Rules and Regulations	99
3.4	Undertaking for Refraining from Possession and Use of Drugs and Alcohol	100
<b>4</b>	<b>IMPORTANT CONTACTS</b>	101

## **PREAMBLE**

The Handbook (Student's Information Booklet) for Students, printed in two volumes contain General Information Respectively about the CHARUSAT University and detailed information about Indukaka Ipcowala Institute of Management.

Handbook Volume-I contains information about general rules to be followed by the students on campus. It gives information about the general facilities and support available for the students on campus. It gives insight about the discipline and conduct rules of the University.

This Handbook (Student's Information Booklet) is for the purpose of providing information to the students about the University and its programmes and is not a Regulation book of the University. Hence, no claim can be made based on the information given in the book.

The University / Institute reserves the right to amend the rules and regulations mentioned in the Handbook without any prior notice. The decision of the University shall be final on all matters. For any clarification, the Student Section may be contacted.

Handbook Volume-II (Student's Information Booklet) contains academic information about the Institute, which includes the Academic Rules and Regulations regarding academic requirements and academic conduct of the students at the University including different policies and forms. Besides, it includes important information on registration, grading system, academic standards, attendance norms, discipline and the like. The students shall abide by these rules and shall, at all times, conduct in a manner so as to bring credit to the University and enhance its prestige in the society.

It is prime responsibility of the students to get familiar (themselves) with the rules and regulations

## **About the Institute**

Ramanbhai Patel College of Pharmacy (RPCP) is a constituent Institute of Charotar University of Science and Technology (CHARUSAT). RPCP was established in the year 2004 with a view to promote excellence in Pharmacy Education and to prepare young talent to meet the challenges of Industrial Pharmacy and Pharmacy Practice. The Institute has the patronage of Zydus Cadila Health Care Ltd; patronized by Shri Pankaj Patel, CMD, Zydus Cadila Healthcare Ltd to commemorate his father, Late Shri Ramanbhai Patel. A Visionary Entrepreneur and a Philanthropist. M.Pharm Programs at RPCP are executed under the auspices of T. P. Patel Centre for PG studies in Pharmacy. The centre in patronized by Shri Jagdishbhai Patel and Shri H. T. Patel and their families to monumentalize their father, Late Shri T. P. Patel.

### **Vision**

To Become a Premier Pharma Institute by Creating World Class Pharmacists and Researchers

### **Mission**

To Strive for the Excellence in Pharmaceutical Sciences through Quality Education and Research

## **SECTION - 1**

### **PROGRAMME SPECIFIC: M.Pharm (Pharmaceutical Chemistry)**

**1.1 Academic Regulation**

**&**

**1.2 B.Pharm Programme Structure (Teaching & Examination Scheme)**

**ACADEMIC**  
**REGULATIONS**  
**&**  
**SYLLABUS**

**Faculty of Pharmacy Master of Pharmacy**  
**Programme**

**(Pharmaceutical Chemistry)**

**(AS PER PCI SYLLABUS)**

**A.Y. 2023-2024**

**Ramanbhai Patel College of Pharmacy**

**CHAROTAR UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY**  
**MASTER OF PHARMACY (M. Pharm.) PROGRAMME**

**Vision of RPCP**

*To Become a Premier Pharma Institute by Creating World Class Pharmacists  
and Researchers.*

**Mission of RPCP**

*To Strive for the Excellence in Pharmaceutical Sciences through Quality  
Education and Research.*

## PROGRAM OUTCOMES

- 1. Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.
- 2. Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.
- 3. Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.
- 4. Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.
- 5. Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfilment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.
- 6. Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).
- 7. Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.
- 8. Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.
- 9. The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.
- 10. Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**11. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

**FACULTY OF PHARMACY**  
**ACADEMIC REGULATIONS**  
**MASTER OF PHARMACY (M. Pharm.) PROGRAMME**  
**Choice Based Credit System (CBCS)**

**1. Short Title and Commencement**

These regulations shall be called as “The Revised Academic Regulations for the postgraduate programmes under the Faculty of Pharmacy”. They shall come into effect from the Academic Year 2018-19. The regulations framed are subject to modifications from time to time by the respective regulatory bodies.

**2. Minimum Qualification for Admission**

2.1 Candidate shall have passed B. Pharm Degree examination of an Indian university established by law in India from an institution approved by Pharmacy Council of India and has scored not less than 55 % of the maximum marks (aggregate of 4 years of B.Pharm.)

2.2 Every student, selected for admission to post graduate pharmacy program in any PCI approved institution should have obtained registration with the State Pharmacy Council or should obtain the same within one month from the date of his/her admission, failing which the admission of the candidate shall be cancelled.

Note: It is mandatory to submit a migration certificate obtained from the respective university where the candidate had passed his/her qualifying degree (B.Pharm.).

**3. Duration of the Programme**

The course of study for M.Pharm shall extend over a period of four semesters (two academic years). The curricula and syllabi for the program shall be prescribed from time to time by Pharmacy Council of India, New Delhi.

**4. Medium of Instruction and Examinations**

Medium of instruction and examination shall be in English.

**5. Working Days in a Semester**

Each semester shall consist of not less than 100 working days. The odd semesters shall be conducted from the month of June/July to November/December and the even semesters shall be conducted from December/January to May/June in every calendar year.

**6. Attendance and Progress**

A candidate is required to put in at least 80% attendance in individual courses considering theory and practical separately. The candidate shall complete the prescribed course satisfactorily to be eligible to appear for the respective examinations.

## **7. Programme Credit Structure**

As per the philosophy of Credit Based Semester System, certain quantum of academic work viz. theory classes, tutorial hours, practical classes, etc. are measured in terms of credits. On satisfactory completion of the courses, a candidate earns credits. The amount of credit associated with a course is dependent upon the number of hours of instruction per week in that course. Similarly, the credit associated with any of the other academic, co/extra-curricular activities is dependent upon the quantum of work expected to be put in for each of these activities per week.

### **7.1. Credit assignment**

#### **7.1.1. Theory and Laboratory courses**

Courses are broadly classified as Theory and Practical. Theory courses consist of lecture (L) and Practical (P) courses consist of hours spent in the laboratory. Credits (C) for a course is dependent on the number of hours of instruction per week in that course, and is obtained by using a multiplier of one (1) for lecture and a multiplier of half (1/2) for practical (laboratory) hours. Thus, for example, a theory course having four lectures per week throughout the semester carries a credit of 4. Similarly, a practical having four laboratory hours per week throughout semester carries a credit of 2.

The contact hours of seminars, assignments and research work shall be treated as that of practical courses for the purpose of calculating credits. i.e., the contact hours shall be multiplied by 1/2. Similarly, the contact hours of journal club, research work presentations and discussions with the supervisor shall be considered as theory course and multiplied by 1.

### **7.2. Minimum credit requirements**

The minimum credit points required for the award of M. Pharm. degree is 93. However based on the credit points earned by the students under the head of co-curricular activities, a student shall earn a maximum of 98 credit points. These credits are divided into Theory courses, Practical, Seminars, Assignments, Research work, Discussions with the supervisor, Journal club and Co-Curricular activities over the duration of four semesters. The credits are distributed semester-wise. Courses generally progress in sequence, building competencies and their positioning indicates certain academic maturity on the part of the learners. Learners are expected to follow the semester-wise schedule of courses given in the syllabus.

## **8. Academic work**

A regular record of attendance both in Theory, Practical, Seminar, Assignment, Journal club, Discussion with the supervisor, Research work presentation and Dissertation shall be maintained by the department / teaching staff of respective courses.

## **9. Examinations/Assessments**

The scheme for internal assessment and end semester examinations is given in Annexure II (Table – 1 to 5).

### **9.1. End Semester Examinations**

The End Semester Examinations for each theory and practical course through semesters I to IV shall be conducted by the University for which Examinations shall be conducted by the subject experts at college level and the marks/grades shall be submitted to the university.

### **9.2. Internal Assessment: Continuous Mode**

The marks allocated for Continuous mode of Internal Assessment shall be awarded as per the scheme given below.

**Table- 1: Scheme for awarding internal assessment: Continuous mode**

<b>Theory</b>	
<b>Criteria</b>	<b>Maximum Marks</b>
Attendance (Refer Table – 2)	8
Student – Teacher interaction	2
<b>Total</b>	10
<b>Practical</b>	
Attendance (Refer Table – 2)	10
Based on Practical Records, Regular viva voce, etc.	10
<b>Total</b>	20

**Table- 2: Guidelines for the allotment of marks for attendance**

<b>Percentage of Attendance</b>	<b>Theory</b>	<b>Practical</b>
95 – 100	8	10
90 – 94	6	7.5
85 – 89	4	5
80 – 84	2	2.5
Less than 80	0	0

### **9.2.1. Sessional Exams**

Two Sessional exams shall be conducted for each theory / practical course as per the schedule fixed by the college. The scheme of question paper for theory and practical Sessional examinations will be as prescribed by the regulatory body. The average marks of two Sessional exams shall be computed for internal assessment as per the requirements given in Annexure II. Sessional exam shall be conducted for 30 marks for theory and shall be computed for 15 marks. Similarly, Sessional exam for practical shall be conducted for 40 marks and shall be computed for 10 marks.

#### **10. Promotion and Award of Grades**

A student shall be declared PASS and eligible for getting grade in a course of M.Pharm. Programme, if he/she secures at least 50% marks in that particular course including internal assessment.

#### **11. Carry Forward of Marks**

In case a student fails to secure the minimum 50% in any Theory or Practical course as specified in 9 above, then he/she shall reappear for the end semester examination of that course. However, his/her marks of the Internal Assessment shall be carried over and he/she shall be entitled for grade obtained by him/her on passing.

#### **12. Improvement of Internal Assessment**

A student shall have the opportunity to improve his/her performance only once in the Sessional exam component of the internal assessment. The re-conduct of the Sessional exam shall be completed before the commencement of next end semester theory examinations.

#### **13. Re-examination of End Semester Examinations**

Re-examination of end semester examination shall be conducted as per the schedule given in table 3. The exact dates of examinations shall be notified from time to time.

**Table-3: Tentative schedule of end semester examinations**

Semester	For Regular Candidates	For Failed Candidates	
		Remedial Examination-1	Remedial Examination-2*
I and III	November / December	After 15 days of the declaration of the result of the end semester Examination	last week of June/

II and IV	May / June	After 15 days of the declaration of the result of the end semester Examination	end of the Academic Year, which is earlier
-----------	------------	--	--

\* If student who are remain left from end semester examination and remedial examination-1.

#### **14. Academic Progression**

No student shall be admitted to any examination unless he/she fulfils the norms given in item no. 6 under the heading of attendance and progress. Academic progression rules are applicable as follows:

- **“Student will not be allowed to move to next year if she/he has not cleared all the courses of the previous year”**
- A student shall be eligible to carry forward all the courses of I<sup>st</sup> semesters till the II<sup>nd</sup> semester examinations. However, he/she shall not be eligible to attend the courses of the III<sup>rd</sup> semester until all the courses of the I<sup>st</sup> and II<sup>nd</sup> semesters are successfully completed.
- A student shall be eligible to get his/her CGPA upon successful completion of the courses of I to IV semesters within the stipulated time period as per the norms.
- Note: Grade “NA” should be considered as failed and treated as one head for deciding ATKT. Such rules are also applicable for those students who fail to register for examination(s) of any course in any semester.

#### **15. Grading of Performances (Letter Grades and Grade Points Allocations)**

Based on the performances, each student shall be awarded a final letter grade at the end of the semester for each course. The letter grades and their corresponding grade points are given in Table – 4.

**Table-4: Letter grades and grade points equivalent to Percentage of marks and performances**

Percentage of Marks Obtained	Letter Grade	Grade Point	Performance
90.00 – 100	AA	10	Outstanding
80.00 – 89.99	AB	9	Excellent
70.00 – 79.99	BB	8	Good
60.00 – 69.99	BC	7	Fair
50.00 – 59.99	CC	6	Average

Less than 50	FF	0	Fail
Absent	NA	0	Fail

A learner who remains absent for any end semester examination shall be assigned a letter grade of “NA” and a corresponding grade point of zero. He/she should reappear for the said evaluation/examination in due course.

### **16. Semester Grade Point Average (SGPA)**

The performance of a student in a semester is indicated by a number called ‘Semester Grade Point Average’ (SGPA). The SGPA is the weighted average of the grade points obtained in all the courses by the student during the semester. For example, if a student takes five courses(Theory/Practical) in a semester with credits C1, C2, C3, C4 and C5 and the student’s grade points in these courses are G1, G2, G3, G4 and G5, respectively, and then students’ SGPA is equal to:

$$\text{SGPA} = \frac{C1G1+C2G2+C3G3+C4G4}{C1+C2+C3+C4}$$

The SGPA is calculated to two decimal points. It should be noted that, the SGPA for any semester shall take into consideration the FF and Ab. grade awarded in that semester. For example if a learner has a FF or Ab. grade in course 4, the SGPA shall then be computed as:

$$\text{SGPA} = \frac{C1G1+C2G2+C3G3+C4Zero}{C1+C2+C3+C4}$$

### **17. Cumulative Grade Point Average (CGPA)**

The CGPA is calculated with the SGPA of all the VIII semesters to two decimal points and is indicated in final grade report card/final transcript showing the grades of all VIII semesters and their courses. The CGPA shall reflect the failed status in case of FF grade(s), till the course(s) is/are passed. When the course(s) is/are passed by obtaining a pass grade on subsequent examination(s) the CGPA shall only reflect the new grade and not the fail grades earned earlier. The CGPA is calculated as:

$$\text{CGPA} = \frac{C1S1+C2S2+C3S3+C4S4}{C1+C2+C3+C4}$$

where C1, C2, C3,... is the total number of credits for semester I,II,III,... and S1,S2, S3,...is

the SGPA of semester I,II,III,.... .

**No student will be allowed to move further if CGPA is less than 3 at the end of every academic year.**

### **18. Declaration of Class (Table-5)**

The class shall be awarded on the basis of CGPA as follows:

First Class with Distinction	= CGPA of. 7.50 to 10.0
First Class	= CGPA of 6.0 to 7.49
Second Class	= CGPA of 5.0 to 5.99
Pass Class	< CGPA of 5.00

### **19. Project Work**

All the students shall undertake a project under the supervision of a teacher in Semester III to IV and submit a report. 4 copies of the project report shall be submitted (typed & bound copy not less than 75 pages).

The internal and external examiner appointed by the University shall evaluate the project at the time of the Practical examinations of other semester(s). The projects shall be evaluated as per the criteria given below.

<b>Evaluation of Dissertation Book</b>				
<b>Criteria</b>	<b>Semester-III</b>		<b>Semester-IV</b>	
			<b>Internal Evaluation (Marks)</b>	<b>External Evaluation (Marks)</b>
Objective(s) of the work done	--		05	05
Methodology Adopted	--		25	25
Results and Discussions	--		15	15
Conclusions and Outcome	--		05	05
Total	--		50	50
<b>Final Total</b>			<b>100</b>	
<b>Evaluation of Presentation</b>				
<b>Criteria</b>	<b>Semester-III</b>		<b>Semester-IV</b>	
	<b>Internal Evaluation (Marks)</b>	<b>External Evaluation (Marks)</b>	<b>Internal Evaluation (Marks)</b>	<b>External Evaluation (Marks)</b>
Presentation of work	75	100	75	75
Communication skills	25	50	25	25
Question and answer skills	50	50	50	50
Total	150	200	150	150
<b>Final Total</b>	<b>350</b>		<b>300</b>	

## **20. Award of Ranks**

Ranks and Medals shall be awarded on the basis of final CGPA. However, candidates who fail in one or more courses during the M.Pharm program shall not be eligible for award of ranks. Moreover, the candidates should have completed the M. Pharm program in minimum prescribed number of years, (two years) for the award of Ranks.

## **22. Award of degree**

Candidates who fulfil the requirements mentioned above shall be eligible for award of degree during the ensuing convocation.

## **23. Duration for completion of the program of study**

The duration for the completion of the program shall be fixed as double the actual duration of the program and the students have to pass within the said period, otherwise they have to get fresh Registration.

**24. Extra Credit:**

An extra credit is to be offered to a student for achievements in co-curricular and extra- curricular activities. This credit shall not be counted while considering the minimum credits for completing the program. The activities and appropriate weight (points) to be allocated to award an extra credit are broadly classified as per the table below:

Sr. no.	Name of the Activity	Maximum Credit Points Eligible / Activity
1	Participation in National Level Seminar/Conference/Workshop/Symposium/ Training Programs (related to the specialization of the student)	01
2	Participation in international Level Seminar/Conference/Workshop/Symposium/ Training Programs (related to the specialization of the student)	02
3	Academic Award/Research Award from State Level/National Agencies	01
4	Academic Award/Research Award from International Agencies	02
5	Research / Review Publication in National Journals (Indexed in Scopus / Web of Science)	01
6	Research / Review Publication in International Journals (Indexed in Scopus / Web of Science)	02

**Note: International Conference: Held Outside India**

**International Journal: The Editorial Board Outside India**

**\*The credit points assigned for extracurricular and or co-curricular activities shall be given by the Principals of the colleges and the same shall be submitted to the University. The criteria to acquire this credit point shall be defined by the colleges from time to time.**

**CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY**  
**MASTER OF PHARMACY (PHARMACEUTICAL CHEMISTRY) PROGRAMME**

Schemes for internal assessments and end semester examinations

**SEMESTER-I**

**SCHEME OF TEACHING**

Course Code	Course Name	Credit Hours	Credit Points	Hrs/Week
PHCCC009	Modern Pharmaceutical Analytical Techniques	4	4	4
PHPCM001	Advanced Organic Chemistry-I	4	4	4
PHPCM002	Advanced Medicinal Chemistry	4	4	4
PHPCM003	Chemistry of Natural Products	4	4	4
PHPCM004	Pharmaceutical Chemistry Practical – I	12	6	12
PHPCM005	Seminar/Assignment-I	2	1	2
---	DHSS Elective-I*	2	2	2
<b>Total</b>		<b>32</b>	<b>25</b>	<b>32</b>

**SCHEME OF EVALUATION**

Course Code	Course	Internal Assessment				End Semester Exams		Total Marks	
		Continuous Mode	Sessional Exams		Total	Marks	Duration		
			Marks	Duration					
PHCCC009	Modern Pharmaceutical Analytical Techniques	10	15	1Hr	25	75	3Hrs	100	
PHPCM001	Advanced Organic Chemistry-I	10	15	1Hr	25	75	3Hrs	100	
PHPCM002	Advanced Medicinal Chemistry	10	15	1Hr	25	75	3Hrs	100	
PHPCM003	Chemistry of Natural Products	10	15	1Hr	25	75	3Hrs	100	
PHPCM004	Pharmaceutical Chemistry Practical - I	20	30	6Hrs	50	100	6Hrs	150	

PHPCM005	Seminar/ Assignment-I	-	-	-	<b>100</b>	-	-	<b>100</b>
---	DHSS elective- I*	-	-	-	<b>30</b>	<b>70</b>	-	<b>100</b>
Total								<b>750</b>

**\*DHSS elective courses: SCHEME OF TEACHING**

Semester	Course Code	Course Name	Credit Hours	Credit Points	Hrs/Week
I	HS105.02 B	Academic Speaking and Presentation Skills	02	02	02

**\*DHSS elective courses: SCHEME OF EVALUATION**

Course Code	Course Name	Evaluation Scheme				
		Theory		Practical		Total
		Internal	External	Internal	External	
HS105.02 B	Academic Speaking and Presentation Skills	-	-	30	70	100

**CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY**  
**MASTER OF PHARMACY (PHARMACEUTICAL CHEMISTRY) PROGRAMME**

Schemes for internal assessments and end semester examinations

**SEMESTER-II**  
**SCHEME OF TEACHING**

Course Code	Course Name	Cred it Hour s	Cred it Point s	Hrs/Week
PHPCM006	Advanced Spectral Analysis	4	4	4
PHPCM007	Advanced Organic Chemistry-II	4	4	4
PHPCM008	Computer Aided Drug Design	4	4	4
PHPCM009	Pharmaceutical Process Chemistry	4	4	4
PHPCM010	Pharmaceutical Chemistry Practical-II	12	6	12
PHPCM011	Seminar/Assignment-II	2	1	2
---	DHSS elective-II*	2	2	2
---	University Elective-II**	2	2	2
<b>Total</b>		<b>34</b>	<b>27</b>	<b>34</b>

**SCHEME OF EVALUATION**

Course Code	Course	Internal Assessment			Total	End Semester Exams		Total Marks
		Continuo us Mode	Sessional Exams Marks	Duration		Marks	Duration	
PHPCM006	Advanced Spectral Analysis	10	15	1Hr	25	75	3Hrs	100
PHPCM007	Advanced Organic Chemistry-II	10	15	1Hr	25	75	3Hrs	100
PHPCM008	Computer Aided Drug Design	10	15	1Hr	25	75	3Hrs	100
PHPCM009	Pharmaceutical Process Chemistry	10	15	1Hr	25	75	3Hrs	100
PHPCM010	Pharmaceutical Chemistry Practical-II	20	30	6Hrs	50	100	6Hrs	150
PHPCM011	Seminar/Assignment-II	-	-	-	100	-	-	100
---	DHSS elective-II*	-	-	-	30	70	-	100
---	University Elective-II**	-	-	-	25	25	-	50
<b>Total</b>								<b>800</b>

**\*DHSS elective courses: SCHEME OF TEACHING**

Semester	Course Code	Course Name	Credit Hours	Credit Points	Hrs/Week
II	HS106.02 B	Academic Writing	02	02	02

**\*DHSS elective courses: SCHEME OF EVALUATION**

Course Code	Course Name	Evaluation Scheme				Total	
		Theory		Practical			
		Internal	External	Internal	External		
HS106.02 B	Academic Writing	-	-	30	70	100	

**\*\*University elective courses: SCHEME OF TEACHING - Semester-II**

Course Code	Course Name	Credit Hours	Credit Points	Hrs/Week
NRMD551	Mindfulness and Well-Being: Living With Balance and Ease	4	2	4
PTUD796	Yoga and Positive Psychology for Managing Career and Life	4	2	4
FSUD554	Plastic Waste Management	4	2	4
FSUD553	Computational Science in Engineering	4	2	4
FSUD552	Nuclear Astrophysics	4	2	4
FSUD551	Energy Resources, Economics and Sustainability	4	2	4
CAUD518	Software Project Management	4	2	4
MBUD558	Introduction to Operations Research	4	2	4
FTUD501	Blockchain and Its Applications	4	2	4
FTUD502	Sustainable Engineering Concepts and Life Cycle Analysis	4	2	4
FTUD552	Health and Safety Management	4	2	4
OCMPH1003	Introduction on Intellectual Property to Engineers and Technologists	4	2	4

**\*\*University elective courses: SCHEME OF EVALUATION- Semester-II**

Course Code	Course Name	Evaluation Scheme				Total	
		Theory		Practical			
		Internal	External	Internal	External		

NRMD551	Mindfulness and Well-Being: Living With Balance and Ease	-	-	25	25	50
PTUD796	Yoga and Positive Psychology for Managing Career and Life	-	-	25	25	50
FSUD554	Plastic Waste Management	-	-	25	25	50
FSUD553	Computational Science in Engineering	-	-	25	25	50
FSUD552	Nuclear Astrophysics	-	-	25	25	50
FSUD551	Energy Resources, Economics and Sustainability	-	-	25	25	50
CAUD518	Software Project Management	-	-	25	25	50
MBUD558	Introduction to Operations Research	-	-	25	25	50
FTUD501	Blockchain and Its Applications	-	-	25	25	50
FTUD502	Sustainable Engineering Concepts and Life Cycle Analysis	-	-	25	25	50
FTUD552	Health and Safety Management	-	-	25	25	50
OCMPH1003	Introduction on Intellectual Property to Engineers and Technologists	-	-	25	25	50

# CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY

## MASTER OF PHARMACY (PHARMACEUTICAL CHEMISTRY) PROGRAMME

Schemes for internal assessments and end semester examinations

### SEMESTER-III

Course Code	Course Name	Credit Hours	Credit Points	Hrs/Week
PHCCC010	Research Methodology and Biostatistics*	4	4	4
PHCCC011	Journal Club-I	01	01	01
PHPCM012	Discussion / Presentation (Proposal Presentation)	02	02	02
PHPCM013	Research Work-I	28	14	28
	<b>Total</b>	<b>35</b>	<b>21</b>	<b>35</b>

\*Non University Examination

### SCHEME OF EVALUATION

Course Code	Course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams Marks	Sessional Exams Duration	Total	Marks	Duration	
PHCCC010	Research Methodology and Biostatistics	10	15	1	25	75	3	100
PHPCM012	Discussion / Presentation (Proposal Presentation)	-	-	-	50	-	-	50
PHCCC011	Journal Club-I	-	-	-	25	-	-	25
PHPCM013	Research Work-I				-	350	1hr	350
	<b>Total</b>							<b>525</b>

# CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY

## MASTER OF PHARMACY (PHARMACEUTICAL CHEMISTRY) PROGRAMME

Schemes for internal assessments and end semester examinations

### SEMESTER -IV

Course Code	Course Name	Credit Hours	Credit Points	Hrs/Week
PHCCC012	Journal Club-II	1	1	1
PHPCM015	Research Work-II	31	16	31
PHPCM014	Discussion/Presentation	03	03	03
	<b>Total</b>	<b>35</b>	<b>20</b>	<b>35</b>

### SCHEME OF EVALUATION

Course Code	Course	Internal Assessment				End Semester Exams			Total Marks	
		Continuous Mode	Sessional Exams		Total	Marks	Duration			
			Marks	Duration						
PHPCM014	Discussion/Presentation	-	-	-	75	-	-	-	75	
PHCCC012	Journal Club-II	-	-	-	25	-	-	-	25	
PHPCM015	Research Work-II				-	400	1hr	400		
<b>Total</b>								<b>500</b>		

Semester	Credit Point
I	25
II	27
III	21
IV	20
Co-curricular Activity (Attending Conference, Scientific Presentations, Publication, Industry Training and other scholarly Activities)	Maximum 5
<b>Total Credit Point</b>	<b>Minimum- 93</b> <b>Maximum-98*</b>

\*Credit Point for co-curricular activity

**FACULTY OF PHARMACY  
Master of Pharmacy Programme**

**Syllabi  
Semester  
I**

**Charotar University of Science and Technology**

**FACULTY OF PHARMACY**  
**BACHELOR OF PHARMACY PROGRAMME**  
**PHCCC009: MODERN PHARMACEUTICAL ANALYTICAL**  
**TECHNIQUES (Theory)**

---

**Total hours: 60 Hr**

**Outline of the course:**

Sr. No.	Title of the unit	Minimum number of hours
1	UV-Visible spectroscopy	10
	IR spectroscopy	
	Spectrofluorimetry	
	Flame emission spectroscopy and Atomic absorption spectroscopy	
2	NMR Spectroscopy	10
3	Mass Spectroscopy	10
4	Chromatography	10
5	Electrophoresis	10
	X-Ray Crystallography	
6	Potentiometry	10
	Thermal Techniques	

**Detailed Syllabus:**

1.	<b>UV-Visible spectroscopy</b>	<b>10 Hours</b>	<b>16.67%</b>
	<ul style="list-style-type: none"> <li>• UV-Visible spectroscopy: Introduction, Theory, Laws, Instrumentation associated with UV-Visible spectroscopy, Choice of solvents and solvent effect and Applications of UV Visible spectroscopy.</li> </ul>		
	<b>IR spectroscopy</b>		

- |  |  |  |
|--|--|--|
|  | <ul style="list-style-type: none"> <li>• Theory, Modes of Molecular vibrations, Sample handling, Instrumentation of Dispersive and Fourier - Transform IR Spectrometer, Factors affecting vibrational frequencies and Applications of IR spectroscopy</li> </ul> |  |
|--|--|--|

	<p><b>Spectrofluorimetry</b></p> <p>Theory of Fluorescence, Factors affecting fluorescence, Quenchers, Instrumentation and Applications of fluorescence spectrophotometer.</p> <p><b>Flame emission spectroscopy and Atomic absorption Spectroscopy</b></p> <ul style="list-style-type: none"> <li>• Principle, Instrumentation, Interferences and Applications.</li> </ul>		
<b>2.</b>	<b>NMR Spectroscopy</b>	<b>10 Hours</b>	<b>16.67%</b>
	<ul style="list-style-type: none"> <li>• Quantum numbers and their role in NMR, Principle, Instrumentation, Solvent requirement in NMR, Relaxation process, NMR signals in various compounds, Chemical shift, Factors influencing chemical shift, Spin-Spin coupling, Coupling constant, Nuclear magnetic double resonance, Brief outline of principles of FT-NMR and <math>^{13}\text{C}</math> NMR. Applications of NMR spectroscopy.</li> </ul>		
<b>3.</b>	<b>Mass Spectroscopy</b>	<b>10 Hours</b>	<b>16.67%</b>
	<ul style="list-style-type: none"> <li>• Mass Spectrometry: Principle, Theory, Instrumentation of Mass Spectrometry, Different types of ionization like electron impact, chemical, field, FAB and MALDI, APCI, ESI, APPI Analysers of Quadrupole and Time of Flight, Mass fragmentation and its rules, Meta stable ions, Isotopic peaks and Applications of Mass spectrometry.</li> </ul>		

<b>4.</b>	<b>Chromatography</b>	<b>10 Hours</b>	<b>16.67%</b>
	<ul style="list-style-type: none"> <li>Principle, apparatus, instrumentation, chromatographic parameters, factors affecting resolution and applications of the following: a) Thin Layer chromatography b) High Performance Thin Layer Chromatography c) Ion exchange chromatography d) Column chromatography e) Gas chromatography f) High Performance Liquid chromatography g) Ultra High Performance Liquid chromatography h) Affinity chromatography i) Gel Chromatography</li> </ul>		
<b>5.</b>	<b>Electrophoresis</b>	<b>10 Hours</b>	<b>16.67%</b>
	<ul style="list-style-type: none"> <li>Principle, Instrumentation, Working conditions, factors affecting separation and applications of the following: a) Paper electrophoresis b) Gel electrophoresis c) Capillary electrophoresis d) Zone electrophoresis e) Moving boundary electrophoresis f) Isoelectric focusing</li> </ul>		
	<b>X-ray Crystallography</b>		
	<ul style="list-style-type: none"> <li>Production of X-rays, Different X-ray diffraction methods, Bragg's law, Rotating crystal technique, X-ray powder technique, Types of crystals and applications of X-ray diffraction.</li> </ul>		
<b>6.</b>	<b>Potentiometry</b>	<b>10 Hours</b>	<b>16.67%</b>
	<ul style="list-style-type: none"> <li>Principle, working, Ion selective Electrodes and Application of potentiometry</li> </ul>		
	<b>Thermal Techniques</b>		

- |  |   |  |
|--|---|--|
|  | <ul style="list-style-type: none"><li>• Differential Scanning Calorimetry (DSC): Principle, thermal transitions and Instrumentation (Heat flux and power-compensation and designs), Modulated DSC, Hyper DSC, experimental parameters (sample preparation, experimental conditions, calibration, heating and cooling rates, resolution, source of errors) and their influence, advantage and disadvantages, pharmaceutical applications.</li><li>• Differential Thermal Analysis (DTA): Principle, instrumentation and advantage and disadvantages, pharmaceutical applications, derivative differential thermal analysis (DDTA). TGA: Principle, instrumentation, factors affecting results, advantage and disadvantages, pharmaceutical applications.</li></ul> |  |
|--|---|--|

### **Course Outcome (COs):**

At the end of the course, the students would be able to;

CO1	describe theory and principle of various spectroscopic and chromatographic separation techniques.									
CO2	describe instrumentation and application of various spectroscopic and chromatographic separation techniques with justification.									
CO3	summarize approaches to be adopted for quantitative & qualitative analysis of drugs in single and combine dosage forms.									
CO4	Describe use of thermal methods and potentiometry in analysis of drugs/formulations									
CO5	interpret the spectra and propose the structure of organic compounds.									

### **Course Articulation Matrix:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	-	-	-	-	-	-	-	3
CO2	3	3	3	-	3	-	-	3	-	3	3
CO3	3	3	3	3	-	3	-	3	-	3	3
CO4	3	3	3	3	-	-	-	3	-	-	3
CO5	3	-	3	3	-	-	-	3	-	-	3

### **❖ References:**

1. Spectrometric Identification of Organic compounds - Robert M Silverstein, Sixth edition, John Wiley & Sons, 2004.
2. Principles of Instrumental Analysis - Doglas A Skoog, F. James Holler, Timothy A. Nieman, 5th edition, Eastern press, Bangalore, 1998
3. Instrumental methods of analysis – Willards, 7th edition, CBS publishers.
4. Practical Pharmaceutical Chemistry – Beckett and Stenlake, Vol II, 4th edition, CBS Publishers, New Delhi, 1997.
5. Organic Spectroscopy - William Kemp, 3rd edition, ELBS, 1991.
6. Quantitative Analysis of Drugs in Pharmaceutical formulation - P D Sethi, 3rd Edition, CBS Publishers, New Delhi, 1997.
7. Pharmaceutical Analysis- Modern methods – Part B - J W Munson, Volume 11, Marcel Dekker Series.
8. The Analysis of Drugs in Biological Fluids, Joseph Chamberlain, CRC Press

**FACULTY OF PHARMACY**  
**MASTER OF PHARMACY PROGRAMME**  
**PHPCM001: ADVANCED ORGANIC CHEMISTRY-I (Theory)**

**Total hours: 60 Hr**

**Outline of the course:**

Sr. No.	Title of the unit	Minimum number of hours
1	Basic Aspects of Organic Chemistry	12
2	Study of mechanism and synthetic applications of named Reactions	12
3	Synthetic Reagents & Applications and Protection- Deprotection of functional group	12
4	Heterocyclic Chemistry	12
5	Synthon approach and retrosynthesis applications	12

**Detailed Syllabus:**

Sr. No.	UNIT	Hours	Weightage (%)
1. <b>Basic Aspects of Organic Chemistry</b>	a. Organic intermediates: Carbocations, carbanions, free radicals, carbenes and nitrenes. Their method of formation, stability and synthetic applications. b. Types of reaction mechanisms and methods of determining them c. Detailed knowledge regarding the reactions, mechanisms and their relative reactivity and orientations. d. Nucleophilic uni- and bimolecular reactions (SN1 and SN2) Elimination reactions (E1 & E2; Hoffman & Saytzeff's rule) Rearrangement reaction	12	20%
2. <b>Study of mechanism and synthetic applications of following named reactions</b>		12	20%

	Ugi reaction, Brook rearrangement, Ullmann coupling reactions, Dieckmann Reaction, Doeblner-Miller Reaction, Sandmeyer Reaction, Mitsunobu reaction, Mannich reaction, Vilsmeier-Haack Reaction, Sharpless asymmetric epoxidation, Baeyer-Villiger oxidation, Shapiro & Suzuki reaction, Ozonolysis and Michael addition reaction		
<b>3.</b>	<b>Synthetic Reagents &amp; Applications</b>	<b>12</b>	<b>20%</b>
	Aluminiumisopropoxide, N-bromosuccinamide, diazomethane, dicyclohexylcarbodiimide, Wilkinson reagent, Wittig reagent. Osmium tetroxide, titanium chloride, diazopropane, diethyl azodicarboxylate, Triphenylphosphine, Benzotriazol-1-yloxy) tris (dimethylamino) phosphonium hexafluoro-phosphate (BOP).  <b>3.1 Protecting groups</b> Role of protection in organic synthesis Protection for the hydroxyl group, including 1,2-and 1,3-diols: ethers, esters, carbonates, cyclic acetals & ketals Protection for the Carbonyl Group: Acetals and Ketals Protection for the Carboxyl Group: amides and hydrazides, esters Protection for the Amino Group and Amino acids: carbamates and amides		
<b>4.</b>	<b>Heterocyclic Chemistry</b>	<b>12</b>	<b>20%</b>
	<b>4.1</b> Organic Name reactions with their respective mechanism and application involved in synthesis of drugs containing five, six membered and fused heterocyclic such as Debus-Radziszewski imidazole synthesis, Knorr Pyrazole Synthesis Pinner Pyrimidine Synthesis, Combes Quinoline Synthesis, Bernthsen Acridine Synthesis, Smiles rearrangement and Traube purine synthesis.  <b>4.2</b> Synthesis of few representative drugs containing these heterocyclic nucleus such as Ketoconazole, Metronidazole, Miconazole, celecoxib, antipyrin, Metamizole sodium,		

	Terconazole, Alprazolam, Triamterene, Sulfamerazine, Trimethoprim, Hydroxychloroquine, Quinine, Chloroquine, Quinacrine, Amsacrine, Prochlorperazine, Promazine, Chlorpromazine, Theophylline, Mercaptopurine and Thioguanine.		
<b>5.</b>	<b>Synthon approach and retrosynthesis applications</b>	<b>12</b>	<b>20%</b>
	a. Basic principles, terminologies and advantages of retrosynthesis; guidelines for dissection of molecules. b. Functional group interconversion and addition (FGI and FGA) c. C-X disconnections; C-C disconnections – alcohols and carbonyl compounds; 1,2-, 1,3-,1,4-, 1,5-, 1,6-difunctionalized compounds d. Strategies for synthesis of three, four, five and six-membered ring.		

#### Course Outcome (COs):

CO1	describe the mechanism & applications of various named reactions
CO2	understand the chemistry of heterocyclic compounds
CO3	narrate concept of disconnection to develop synthetic routes for small target molecule.
CO4	summarize various catalysts used in organic reactions

#### Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11
CO1	3	-	-	-	-	-	-	-	-	-	3
CO2	3	-	-	-	-	-	-	-	-	-	3
CO3	3	-	-	-	-	-	-	-	-	-	3
CO4	3	-	-	-	-	-	-	-	-	3	3

### **Recommended Study Material:**

#### **❖ Text book:**

1. "Advanced Organic chemistry, Reaction, Mechanisms and Structure", J March, John Wiley and Sons, New York.
2. "Mechanism and Structure in Organic Chemistry", ES Gould, Hold Rinchart and Winston, New York.
3. "Organic Chemistry" Clayden, Greeves, Warren and Wothers., Oxford University Press 2001.
4. "Organic Chemistry" Vol I and II. I.L. Finar. ELBS, Pearson Education Lts, Dorling Kindersley 9 India) Pvt. Ltd.
5. A guide to mechanisms in Organic Chemistry, Peter Skyes (Orient Longman, New Delhi).
6. Reactive Intermediates in Organic Chemistry, Tandom and Gowel, Oxford & IBH Publishers.
7. Combinational Chemistry – Synthesis and applications – Stephen R Wilson & Anthony W Czarnik, Wiley – Blackwell.
8. Carey, Organic Chemistry, 5<sup>th</sup> Edition (Viva Books Pvt. Ltd.)
9. Organic Synthesis - The Disconnection Approach, S. Warren, Wily India
10. Principles of Organic Synthesis, ROC Norman and JM Coxan, Nelson Thornes.
11. Organic Synthesis - Special Techniques. VK Ahluwalia and R Agarwal, Narosa Publishers.

**FACULTY OF PHARMACY**  
**MASTER OF PHARMACY PROGRAMME**  
**PHPCM002: ADVANCED MEDICINAL CHEMISTRY (Theory)**

**Total hours: 60 Hr**

**Outline of the course:**

Sr. No.	Title of the unit	Minimum number of hours
1	Drug Discovery and Drug Target	12
2	Prodrug Design and Analog design	12
3	Advanced Medicinal Chemistry of Selective Class of Drug	12
4	Rational Design of Enzyme Inhibitors	12
5	Peptidomimetics	12

**Detailed Syllabus:**

Sr. No.	UNIT	Hours	Weightage (%)
1.	<b>Drug Discovery and Drug Target</b>  Drug discovery: Stages of drug discovery, lead discovery; identification, validation and diversity of drug targets.  Biological drug targets: Receptors, types, binding and activation, theories of drug receptor interaction, drug receptor interactions, agonists vs antagonists, artificial enzymes.	12	20%
2.	<b>Prodrug Design and Analog design</b>  <b>2.1</b> Prodrug design: Basic concept, Carrier linked prodrugs/ Bioprecursors, Prodrugs of functional group, Prodrugs to improve patient acceptability, Drug solubility, Drug absorption and distribution, site specific drug delivery and sustained drug action. Rationale of prodrug design and practical consideration of prodrug design.  <b>2.2</b> Combating drug resistance: Causes for drug resistance, strategies to combat drug resistance in antibiotics and anticancer therapy,	12	20%

	Genetic principles of drug resistance. C  <b>2.3</b> Analog Design: Introduction, Classical & Non classical, Bioisosteric replacement strategies, rigid analogs, alteration of chain branching, changes in ring size, ring position isomers, design of stereo isomers and geometric isomers, fragments of a lead molecule, variation in inter atomic distance.		
<b>3.</b>	<b>Advanced Medicinal Chemistry of Selective Class of Drug</b>	<b>12</b>	<b>20%</b>
	Systematic study, SAR, Mechanism of action and synthesis of new generation molecules of following class of drugs:  <b>3.1</b> Anti-hypertensive drugs, Psychoactive drugs, Anticonvulsant drugs, H1 & H2 receptor antagonist, COX1 & COX2 inhibitors, Adrenergic & Cholinergic agents, Antineoplastic and Antiviral agents.  <b>3.2</b> Stereochemistry and Drug action: Realization that stereo selectivity is a pre-requisite for evolution. Role of chirality in selective and specific therapeutic agents. Case studies, Enantio-selectivity in drug adsorption, metabolism, distribution and elimination.		
<b>4.</b>	<b>Rational Design of Enzyme Inhibitors</b>	<b>12</b>	<b>20%</b>
	Enzyme kinetics & Principles of Enzyme inhibitors, Enzyme inhibitors in medicine, Enzyme inhibitors in basic research, rational design of non-covalently and covalently binding enzyme inhibitors.		
<b>5.</b>	<b>Peptidomimetics</b>	<b>12</b>	<b>20%</b>
	Therapeutic values of Peptidomimetics, design of peptidomimetics by manipulation of the amino acids, modification of the peptide backbone, incorporating conformational constraints locally or globally. Chemistry of prostaglandins, leukotrienes and thromboxones.		

### **Course Outcome (COs):**

At the end of the course, the students would be able to;

CO1	Describe different stages and techniques of Drug Discovery and Development
CO2	Summarize various strategies to design and develop new drug like molecules for biological targets
CO3	Understand role of medicinal chemistry in drug research
CO4	Narrate designing strategy and therapeutical value of peptidomimetics.

### **Course Articulation Matrix:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11
CO1	3	-	-	-	-	-	-	-	-	-	3
CO2	3	-	-	3	-	-	-	-	-	-	3
CO3	3	-	-	-	-	-	-	-	-	-	3
CO4	3	-	-	3	-	-	-	-	-	-	3

### **Recommended Study Material:**

#### **❖ Text book:**

1. Medicinal Chemistry by Burger, Vol I –VI. 2.
2. Wilson and Gisvold's Text book of Organic Medicinal and Pharmaceutical Chemistry, 12<sup>th</sup> Edition, Lippincott Williams & Wilkins, Wolress Kluwer (India) Pvt.Ltd, New Delhi.
3. Comprehensive Medicinal Chemistry – Corwin and Hansch.
4. Computational and structural approaches to drug design edited by Robert M Stroud and Janet. F Moore 81.
5. Introduction to Quantitative Drug Design by Y.C. Martin.
6. Principles of Medicinal Chemistry by William Foye, 7<sup>th</sup> Edition, Ippincott Williams & Wilkins, Wolress Kluwer (India) Pvt.Ltd, New Delhi.
7. Drug Design Volumes by Arienes, Academic Press, Elsevier Publishers, Noida, Uttar Pradesh.
8. Principles of Drug Design by Smith.

9. The Organic Chemistry of the Drug Design and Drug action by Richard B. Silverman, II Edition, Elsevier Publishers, New Delhi.
10. An Introduction to Medicinal Chemistry, Graham L.Patrick, III Edition, Oxford University Press, USA.
11. Biopharmaceutics and pharmacokinetics, D.M. Brahmkar, Sunil B. Jaiswal II Edition, 2014, Vallabh Prakashan, New Delhi.
12. Peptidomimetics in Organic and Medicinal Chemistry by Antonio Guarna and Andrea Trabocchi, First edition, Wiley publishers.

**FACULTY OF PHARMACY**  
**MASTER OF PHARMACY PROGRAMME**  
**PHPCM003: CHEMISTRY OF NATURAL PRODUCTS (Theory)**

---

**Total hours: 60 Hr**

**Outline of the course:**

Sr. No.	Title of the unit	Minimum number of hours
1	Study of Natural products as leads for new pharmaceuticals for the following class of drugs	12
2	Alkaloids, Flavonoids and Steroids	12
3	Terpenoids and Vitamins	12
4	Recombinant DNA technology and examples of crude drug use in Diabetic therapy	12
5	Structural elucidation of natural compounds	12

**Detailed Syllabus:**

Sr. No.	UNIT	Hours	Weightage (%)
1.	<b>Study of Natural products as leads for new pharmaceuticals for the following class of drugs</b>	12	20%
	a) Drugs Affecting the Central Nervous System: Morphine Alkaloids  b) Anticancer Drugs: Paclitaxel and Docetaxel, Etoposide, and Teniposide  c) Cardiovascular Drugs: Lovastatin, Teprotide and Dicoumarol  d) Neuromuscular Blocking Drugs: Curare alkaloids  e) Anti-malarial drugs and Analogues  f) Chemistry of macrolide antibiotics (Erythromycin,		

	Azithromycin, Roxithromycin, and Clarithromycin) and $\beta$ - Lactam antibiotics (Cephalosporins and Carbapenem)		
<b>2.</b>	<b>Alkaloids, Flavonoids and Steroids</b>	<b>12</b>	<b>20%</b>
	<p>General introduction, classification, isolation, purification, molecular modification and biological activity of alkaloids, general methods of structural determination of alkaloids, structural elucidation and stereochemistry of ephedrine, morphine, ergot, emetine and reserpine.</p> <p>Introduction, isolation and purification of flavonoids, General methods of structural determination of flavonoids; Structural elucidation of quercetin.</p> <p>General introduction, chemistry of sterols, sapogenin and cardiac glycosides. Stereochemistry and nomenclature of steroids, chemistry of contraceptive agents male &amp; female sex hormones (Testosterone, Estradiol, Progesterone), adrenocorticoids (Cortisone), contraceptive agents and steroids (Vit – D).</p>		
<b>3.</b>	<b>Terpenoids and Vitamins</b>	<b>12</b>	<b>20%</b>
	<p>Classification, isolation, isoprene rule and general methods of structural elucidation of Terpenoids; Structural elucidation of drugs belonging to mono- (citral, menthol, camphor), di-(retinol, Phytol, taxol) and tri- terpenoids (Squalene, Ginsenoside) carotinoids (<math>\beta</math> carotene).</p> <p>Chemistry and Physiological significance of Vitamin A, B1, B2, B12, C, E, Folic acid and Niacin.</p>		
<b>4.</b>	<b>Recombinant DNA technology and examples of crude drug use in Diabetic therapy</b>	<b>12</b>	<b>20%</b>
	<b>4.1</b> rDNA technology, hybridoma technology, New pharmaceuticals derived from biotechnology; Oligonucleotide therapy. Gene therapy: Introduction, Clinical application and		

	recent advances in gene therapy, principles of RNA & DNA estimation. Active constituent of certain crude drugs used in Indigenous system Diabetic therapy – <i>Gymnema sylvestre</i> , <i>Salacia reticulata</i> , <i>Pterocarpus marsupia</i> , <i>Swertia chirata</i> , <i>Trigonella foenum graccum</i> ; Liver dysfunction – <i>Phyllanthus niruri</i> ; Antitumor – <i>Curcuma longa Linn.</i> .		
<b>5.</b>	<b>Structural elucidation of natural compounds</b>	<b>12</b>	<b>20%</b>
	Structural characterization of natural compounds using IR, $^1\text{H}$ NMR, $^{13}\text{C}$ NMR and MS Spectroscopy of specific drugs e.g., Penicillin, Morphine, Camphor, Vit-D, Quercetin and Digitalis glycosides.		

### Course Outcome (COs):

At the end of the course, the students would be able to;

CO1	summarize different types of natural compounds and their chemistry and medicinal importance.
CO2	describe the importance of natural compounds as lead molecules for new drug discovery.
CO3	comprehend the concept of rDNA technology tool for new drug discovery.
CO4	narrate general methods of structural elucidation of compounds of natural origin.
CO5	understand isolation, purification and characterization of simple chemical constituents from natural source.

### Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11
CO1	3	-	-	-	-	-	-	-	-	-	3
CO2	3	-	-	-	-	-	-	-	-	-	3
CO3	3	-	-	-	-	-	-	-	-	-	3

CO4	3	-	3	-	-	-	-	-	-	-	-	3
CO5	3	-	-	-	-	-	-	-	-	-	-	3

### **Recommended Study Material:**

❖ **Text book:**

1. Modern Methods of Plant Analysis, Peech and M.V.Tracey, Springer – Verlag, Berlin, Heidelberg.
2. Phytochemistry Vol. I and II by Miller, Jan Nostrant Rein Hld.
3. Recent advances in Phytochemistry Vol. I to IV – Scikel Runeckles, Springer Science & Business Media.
4. Chemistry of natural products Vol I onwards IWPAC.
5. Natural Product Chemistry Nakanishi Gggolo, University Science Books, California.
6. Natural Product Chemistry “A laboratory guide” – Rapheal Khan.
7. The Alkaloid Chemistry and Physiology by RHF Manske, Academic Press.
8. Introduction to molecular Phytochemistry – CHJ Wells, Chapmannstall.
9. Organic Chemistry of Natural Products Vol I and II by Gurdeep and Chatwall, Himalaya Publishing House.
10. Organic Chemistry of Natural Products Vol I and II by O.P. Agarwal, Krishan Prakashan.
11. Organic Chemistry Vol I and II by I.L. Finar, Pearson education.
12. Elements of Biotechnology by P.K. Gupta, Rastogi Publishers.
13. Pharmaceutical Biotechnology by S.P.Vyas and V.K.Dixit, CBS Publishers.
14. Biotechnology by Purohit and Mathur, Agro-Bios, 13<sup>th</sup> edition.
15. Phytochemical methods of Harborne, Springer, Netherlands.
16. Burger’s Medicinal Chemistry.

**FACULTY OF PHARMACY**  
**MASTER OF PHARMACY PROGRAMME**  
**PHPCM004: PHARMACEUTICAL CHEMISTRY PRACTICAL - I**  
**(Practical)**

**Total hours: 180 Hr**

**Outline of the course:**

Sr. No.	Title of the unit
1	Analysis of Pharmacopoeial compounds and their formulations by UV Vis spectrophotometer, RNA and DNA estimation.
2	Simultaneous estimation of multi component containing formulations by UV spectrophotometry.
3	Experiments based on Column chromatography.
4	Experiments based on HPLC.
5	Experiments based on Gas Chromatography.
6	Estimation of riboflavin/quinine sulphate by fluorimetry.
7	Estimation of sodium/potassium by flame photometry.
8	Purification of organic solvents, column chromatography.
9	To perform the following reactions of synthetic importance Claisen-schimidt reaction Benzyllic acid rearrangement. Beckmann rearrangement Hoffmann rearrangement Mannich reaction
10	Synthesis of medicinally important compounds involving more than one step along with purification and Characterization using TLC, melting point and IR spectroscopy.
11	Estimation of elements and functional groups in organic natural compounds
12	Isolation, characterization like melting point, mixed melting point, molecular weight determination, functional group analysis, co-chromatographic technique for identification of isolated compounds and interpretation of UV and IR data.

13	Some typical degradation reactions to be carried on selected plant constituents.
----	--

### **Course Outcome (COs):**

At the end of the course, the students would be able to;

CO1	perform and optimize medicinally important name reaction.
CO2	purify and characterize the medicinally important synthesized compounds
CO3	perform the analysis of drug/formulation using analytical instruments like HPTLC, HPLC, UV/vis spectrometer etc.
CO4	analyze the problem, communicate suggested solution and interpret the results.

### **Course Articulation Matrix:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	-	3	-	-	-	-	-	3	-
CO2	3	3	-	-	-	-	-	-	-	3	3
CO3	3	3	-	3	-	-	-	-	-	3	3
CO4	-	3	3	-	3	-	-	-	-	-	-

## **Recommended Study Material:**

### **❖ Text book:**

1. "Advanced Organic chemistry, Reaction, Mechanisms and Structure", J March, John Wiley and Sons, New York.
2. "Mechanism and Structure in Organic Chemistry", ES Gould, Hold Rinchart and Winston, New York.
3. "Organic Chemistry" Clayden, Greeves, Warren and Wothers., Oxford University Press 2001.
4. "Organic Chemistry" Vol I and II. I.L. Finar. ELBS, Pearson Education Lts, Dorling Kindersley 9 India) Pvt. Ltd.
5. A guide to mechanisms in Organic Chemistry, Peter Skyes (Orient Longman, New Delhi).
6. Reactive Intermediates in Organic Chemistry, Tandom and Gowel, Oxford & IBH Publishers.
7. Combinational Chemistry – Synthesis and applications – Stephen R Wilson & Anthony W Czarnik, Wiley – Blackwell.
8. Carey, Organic Chemistry, 5<sup>th</sup> Edition (Viva Books Pvt. Ltd.)
9. Organic Synthesis - The Disconnection Approach, S. Warren, Wiley India
10. Principles of Organic Synthesis, ROC Norman and JM Coxan, Nelson Thornes.
11. Organic Synthesis - Special Techniques. VK Ahluwalia and R Agarwal, Narosa Publishers.
12. Organic Reaction Mechanisms IV<sup>th</sup> Edtn, VK Ahluwalia and RK Parashar, Narosa Publishers

# **CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY**

FACULTY OF MANAGEMENT STUDIES  
DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

## **HS105.02 B: ACADEMIC SPEAKING AND PRESENTATION SKILLS (Sem-I)**

---

### **I. Credits and Schemes:**

Sem	Course Code	Course Name	Credits	Teaching Scheme	Evaluation Scheme					
					Contact Hours/ Week	Theory		Practical		Total
						Internal	External	Internal	External	
1	HS105.02 B	Academic Speaking and Presentation Skills	02	02	--	--	30	70	100	

### **II. Course Outline**

Module No.	Title/Topic	Classroom Contact Hours
1	<b>Foundations of Advance Communication</b> <ul style="list-style-type: none"> <li>• <i>Meaning and Definition of Advance Communication</i></li> <li>• <i>Advance Communication in Digital, Social, Mobile World</i></li> <li>• <i>Strategies for Advance Communication</i></li> <li>• Meaning and Concept of Academic Language</li> <li>• High Frequency Academic Vocabulary</li> </ul>	<b>04</b>
2	<b>Art of Conversation</b> <ul style="list-style-type: none"> <li>• <i>Describing people, places and things</i></li> <li>• <i>Expressing opinions</i></li> <li>• <i>Making suggesting</i></li> <li>• <i>Persuading someone</i></li> <li>• <i>Interpreting and Summarizing</i></li> </ul>	<b>06</b>

<b>3</b>	<b><i>Science of Power Speaking</i></b> <ul style="list-style-type: none"> <li>• <i>Phonemes</i></li> <li>• <i>Word Stress</i></li> <li>• <i>Pronunciation</i></li> <li>• <i>Intonation</i></li> <li>• <i>Pause</i></li> <li>• <i>Register</i></li> <li>• <i>Fluency</i></li> <li>• <i>Prosody</i></li> <li>• <i>Lexical Range</i></li> </ul>	<b>06</b>
<b>4</b>	<b><i>Academic Speaking Application – Part I</i></b> <ul style="list-style-type: none"> <li>• <i>Art of Oratory</i></li> <li>• <i>Formal Presentation</i></li> <li>• <i>Speech Analysis – Decoding Best Speeches</i></li> </ul>	<b>08</b>
<b>5</b>	<b><i>Academic Speaking Application – Part II</i></b> <ul style="list-style-type: none"> <li>• <i>Job Interview</i></li> <li>• <i>Group Discussion</i></li> <li>• <i>Meeting</i></li> </ul>	<b>06</b>
<b>Total</b>		<b>30</b>

### **III. Instruction Methods and Pedagogy**

The course is based on practical learning. Teaching will be facilitated by reading material, discussion, task-based learning, projects, assignments and various interpersonal activities like case studies, group work, independent and collaborative research, presentations etc.

### **IV. Evaluation**

The students will be evaluated continuously in the form of their consistent performance throughout the semester. There is no theoretical evaluation. There is just practical evaluation. The evaluation (practical) is schemed as 30 marks for internal evaluation and 70 marks for external evaluation.

#### **Internal Evaluation**

The students' performance in the course will be evaluated on a continuous basis through the

following components:

<b>Sl. No.</b>	<b>Component</b>	<b>Number</b>	<b>Marks per incidence</b>	<b>Total Marks</b>
1	I-Talk	1	10	25
2	Situational Speaking	1	05	
3	Case Study - Speech Analysis	2	10	
4	Attendance and Class Participation	-		05
<b>Total</b>				<b>30</b>

### **External Evaluation**

The University Practical Examination will be for 70 marks and will test the advance communication skills and academic speaking.

<b>Sl. No.</b>	<b>Component</b>	<b>Number</b>	<b>Marks per incidence</b>	<b>Total Marks</b>
1	Viva / Practical	-	70	70
<b>Total</b>				<b>70</b>

### **Course Outcome (COs):**

After completion of the course the student would:

CO1	understand and demonstrate advance communication skills and academic speaking.
CO2	demonstrate linguistic competence
CO3	demonstrate performing ability at group discussion and personal interview.
CO4	demonstrate the formal presentation skills.
CO5	demonstrate ability to communicate in diverse situations

### **Course Articulation Matrix:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	-	-	-	-	3	-	-	-
CO2	-	-	-	-	-	-	-	3	-	-	-
CO3	-	-	-	-	3	-	-	3	-	-	-
CO4	-	-	-	-	-	-	-	3	-	-	-
CO5	-	2	-	-	3	-	-	3	-	-	-

Correlation levels 1, 2 or 3 are as defined below:

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

### **V. Reference Books**

- Headway Academic Skills - Level 1: Listening, Speaking and Study Skills Student's Book Paperback

### **VI. Reading**

- **Unit 1:** Business communication Today (Thirteenth Edition) by Courtland L. Bovee, John V. Thill and Roshan Lal Raina
- **Unit 2:** Effective Speaking Skills by Terry O' Brien
- **Unit 2:** Speak Better Write Better by Norman Lewis
- **Unit 2:** Well Spoken: Teaching Speaking to All Students by Erik Palmer
- **Unit 3:** Let Us Hear Them Speak : Developing Speaking – Listening Skills in English by Jayshree Mohanraj (Publisher – Sage Publication)
- **Unit 4:** The craft of scientific presentations: Critical steps to succeed and critical errors to avoid. New York: Springer by Michael Alley
- **Unit 4:** Presentation Skills in English by Bob Dignen (Publisher: Orient Black Swan)

**FACULTY OF PHARMACY  
Master of Pharmacy Programme**

**Syllabi  
Semester  
II**

**Charotar University of Science and Technology**

**FACULTY OF PHARMACY**  
**MASTER OF PHARMACY PROGRAMME**  
**PHPCM006: ADVANCE SPECTRAL ANALYSIS (Theory)**

---

**Total hours: 60 Hr**

**Outline of the course:**

Sr. No.	Title of the unit	Minimum number of hours
1	UV and IR spectroscopy	12
2	NMR spectroscopy	12
3	Mass Spectroscopy	12
4	Chromatography	12
5	Miscellaneous analysis	12

**Detailed Syllabus:**

Sr. No.	UNIT	Hours	Weightage (%)
1. <b>UV and IR spectroscopy</b>	Wood ward – Fieser rule for 1,3- butadienes, cyclic dienes and $\alpha$ , $\beta$ -carbonyl compounds and interpretation compounds of enones. ATR-IR, IR Interpretation of organic compounds.	12	20%
2. <b>NMR spectroscopy</b>	1-D and 2-D NMR, NOESY and COSY, HECTOR, INADEQUATE techniques, Interpretation of organic compounds.	12	20%
3. <b>Mass Spectroscopy</b>	Mass fragmentation and its rules, Fragmentation of important functional groups like alcohols, amines, carbonyl groups and alkanes, Meta stable ions, Mc Lafferty rearrangement, Ring rule, Isotopic peaks, Interpretation of organic compounds.	12	20%

<b>4.</b>	<b>Chromatography</b>	<b>12</b>	<b>20%</b>
	Principle, Instrumentation and Applications of the following : a) GC-MS b) GC-AAS c) LC-MS d) LC-FTIR e) LC-NMR f) CE-MS g) High Performance Thin Layer chromatography h) Super critical fluid chromatography i) Ion Chromatography j) I-EC (Ion-Exclusion Chromatography) k) Flash chromatography		
<b>5.</b>	<b>Miscellaneous analysis</b>	<b>12</b>	<b>20%</b>
	a) Thermal methods of analysis Introduction, principle, instrumentation and application of DSC, DTA and TGA. b). Raman Spectroscopy Introduction, Principle, Instrumentation and Applications. c). Radio immuno assay Biological standardization, bioassay, ELISA, Radioimmuno assay of digitalis and insulin.		

### **Course Outcome (COs):**

At the end of the course, the students would be able to;

CO1	interpret NMR, Mass and IR spectra of various organic compounds
CO2	understand theoretical and practical skills of the hyphenated instruments
CO3	identify organic compounds by spectral analysis and assay

### **Course Articulation Matrix:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	-	3	-	-	-	-	-	-	-	3
CO2	3	-	-	-	-	-	-	-	-	-	3
CO3	3	-	3	-	-	-	-	-	-	-	3

### **Recommended Study Material:**

#### **❖ Text book:**

1. Spectrometric Identification of Organic compounds - Robert M Silverstein, Sixth edition, John Wiley & Sons, 2004.
2. Principles of Instrumental Analysis - Doglas A Skoog, F. James Holler, Timothy A.

- Nieman, 5<sup>th</sup> edition, Eastern press, Bangalore, 1998.
3. Instrumental methods of analysis – Willards, 7<sup>th</sup> edition, CBS publishers.
  4. Organic Spectroscopy - William Kemp, 3<sup>rd</sup> edition, ELBS, 1991.
  5. Quantitative analysis of Pharmaceutical formulations by HPTLC - P D Sethi, CBS Publishers, New Delhi.
  6. Quantitative Analysis of Drugs in Pharmaceutical formulation - P D Sethi, 3<sup>rd</sup> Edition, CBS Publishers, New Delhi, 1997.
  7. Pharmaceutical Analysis- Modern methods – Part B - J W Munson, Volume 11, Marcel Dekker Series.

**FACULTY OF PHARMACY**  
**MASTER OF PHARMACY PROGRAMME**  
**PHPCM007: ADVANCED ORGANIC CHEMISTRY – II (Theory)**

**Total hours: 60 Hr**

**Outline of the course:**

Sr. No.	Title of the unit	Minimum number of hours
1	Green Chemistry	12
2	Chemistry of Peptides	12
3	Photochemical and Pericyclic Reactions	12
4	Catalysis	12
5	Stereochemistry & Asymmetric Synthesis	12

**Detailed Syllabus:**

Sr. No.	UNIT	Hours	Weightage (%)
1.	<b>Green Chemistry</b>	12	20%
	a. Introduction, principles of green chemistry b. Microwave assisted reactions: Merit and demerits of its use, increased reaction rates, mechanism, superheating effects of microwave, effects of solvents in microwave assisted synthesis, microwave technology in process optimization, its applications in various organic reactions and heterocycles synthesis c. Ultrasound assisted reactions: Types of sonochemical reactions, homogenous, heterogeneous liquid-liquid and liquid-solid reactions, synthetic applications d. Continuous flow reactors: Working principle, advantages and synthetic applications.		

<b>2.</b>	<b>Chemistry of Peptides</b>	<b>12</b>	<b>20%</b>
	<p>a. Coupling reactions in peptide synthesis  b. Principles of solid phase peptide synthesis, t-BOC and FMOC protocols, various solid supports and linkers: Activation procedures, peptide bond formation, deprotection and cleavage from resin, low and high HF cleavage protocols, formation of free peptides and peptide amides, purification and case studies, site-specific chemical modifications of peptides  c. Segment and sequential strategies for solution phase peptide synthesis with any two case studies</p> <p>Side reactions in peptide synthesis: Deletion peptides, side reactions initiated by proton abstraction, protonation, over activation and side reactions of individual amino acids.</p>		
<b>3.</b>	<b>Photochemical and Pericyclic Reactions</b>	<b>12</b>	<b>20%</b>
	<p>a. Basic principles of photochemical reactions. Photo-oxidation, photo-addition and photo-fragmentation.</p> <p>b. Mechanism, Types of pericyclic reactions such as cyclo addition, electrocyclic reaction and sigmatrophic rearrangement reactions with examples.</p>		
<b>4.</b>	<b>Catalysis</b>	<b>12</b>	<b>20%</b>
	<p>a. Types of catalysis, heterogeneous and homogenous catalysis, advantages and disadvantages.</p> <p>b. Heterogeneous catalysis – preparation, characterization, kinetics, supported catalysts, catalyst deactivation and regeneration, some examples of heterogeneous catalysis used in synthesis of drugs.</p> <p>c. Homogenous catalysis, hydrogenation, hydroformylation, hydrocyanation, Wilkinson catalysts, chiral ligands and chiral induction, Ziegler-Natta catalysts, some examples of homogenous catalysis used in synthesis of drugs.</p> <p>d. Transition-metal and Organo-catalysis in organic synthesis: Metal-catalyzed reactions Biocatalysis: Use of enzymes in organic synthesis, immobilized enzymes/cells in organic reaction.</p>		

	f. Phase transfer catalysis - theory and applications.		
<b>5.</b>	<b>Stereochemistry &amp; Asymmetric Synthesis</b>	<b>12</b>	<b>20%</b>
	Basic concepts in stereochemistry – optical activity, specific rotation, racemates and resolution of racemates, the Cahn, Ingold, Prelog (CIP) sequence rule, meso compounds, pseudo asymmetric centres, axes of symmetry, Fischers D and L notation, cis-trans isomerism, E and Z notation. Methods of asymmetric synthesis using chiral pool, chiral auxiliaries and catalytic asymmetric synthesis, enantiopure separation and Stereo selective synthesis with examples.		

### **Course Outcome (COs):**

At the end of the course, the students would be able to;

CO1	describe the principles and applications of Green chemistry										
CO2	understand the concept of peptide chemistry										
CO3	summarize the various catalysts used in organic reactions										
CO4	comprehend concept of stereochemistry and asymmetric synthesis.										

### **Course Articulation Matrix:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	-	-	-	-	-	-	-	-	-	3
CO2	3	-	-	-	-	-	-	-	-	-	3
CO3	3	-	-	-	-	-	-	-	-	-	3
CO4	3	-	-	-	-	-	-	-	-	-	3

### **Recommended Study Material:**

#### **❖ Text book:**

1. “Advanced Organic chemistry, Reaction, mechanisms and structure”, J March, John Wiley and sons, New York.
2. “Mechanism and structure in organic chemistry”, ES Gould, Hold Rinchart and Winston, New York.
3. “Organic Chemistry” Clayden, Greeves, Warren and Wothers. Oxford University Press 2001.
4. “Organic Chemistry” Vol I and II. I.L. Finar. ELBS, Sixth ed., 1995.
5. Carey, Organic chemistry, 5<sup>th</sup> edition (Viva Books Pvt. Ltd.)
6. Organic synthesis-the disconnection approach, S. Warren, Wily India
7. Principles of organic synthesis, R O C Norman and J M Coxon.
8. Organic synthesis- Special techniques VK Ahluwalia and R Aggarwal, Narosa Publishers.
9. Organic reaction mechanisms IV<sup>th</sup> edition, VK Ahluwalia and RK Parashar, Narosa Publishers.

**FACULTY OF PHARMACY**  
**MASTER OF PHARMACY PROGRAMME**  
**PHPCM008: COMPUTER AIDED DRUG DESIGN (Theory)**

**Total hours: 60 Hr**

**Outline of the course:**

Sr. No.	Title of the unit	Minimum number of hours
1.	Quantitative Structure Activity Relationships-Basic	12
2.	Quantitative Structure Activity Relationships-Application	12
3.	Molecular Modeling and Docking	12
4.	Molecular Properties and Drug Design	12
5.	Pharmacophore Mapping and Virtual Screening	12

**Detailed Syllabus:**

Sr. No.	UNIT	Hours	Weightage (%)
1.	<b>Quantitative Structure Activity Relationships-Basic</b>	12	20%
	History and development of QSAR: Physicochemical parameters and methods to calculate physicochemical parameters: Hammett equation and electronic parameters ( $\sigma$ ), lipophilicity effects and parameters ( $\log P$ , $\pi$ -substituent constant), steric effects (Taft steric and MR parameters) Experimental and theoretical approaches for the determination of these physicochemical parameters.		
2.	<b>Quantitative Structure Activity Relationships: Applications</b>	12	20%
	Hansch analysis, Free Wilson analysis and relationship between them, Advantages and disadvantages; Deriving 2D-QSAR equations. 3D-QSAR approaches and contour map analysis.		

	Statistical methods used in QSAR analysis and importance of statistical parameters.		
--	---	--	--

<b>3.</b>	<b>Molecular Modeling and Docking</b>	<b>12</b>	<b>20%</b>
	a) Molecular and Quantum Mechanics in drug design. b) Energy Minimization Methods: comparison between global minimum conformation and bioactive conformation c) Molecular docking and drug receptor interactions: Rigid docking, flexible docking and extra-precision docking. Agents acting on enzymes such as DHFR, HMG-CoA reductase and HIV protease, choline esterase (AChE & BChE)		
<b>4.</b>	<b>Molecular Properties and Drug Design</b>	<b>12</b>	<b>20%</b>
	a) Prediction and analysis of ADMET properties of new molecules and its importance in drug design. b) De novo drug design: Receptor/enzyme-interaction and its analysis, Receptor/enzyme cavity size prediction, predicting the functional components of cavities, Fragment based drug design. c) Homology modeling and generation of 3D-structure of protein		
<b>5.</b>	<b>Pharmacophore Mapping and Virtual Screening</b>	<b>12</b>	<b>20%</b>
	a. Concept of pharmacophore, pharmacophore mapping, identification of Pharmacophore features and Pharmacophore modeling; Conformational search used in pharmacophore mapping b. <i>In Silico</i> Drug Design and Virtual Screening Techniques Similarity based methods and Pharmacophore based screening, structure based In-silico virtual screening protocols.		

#### **Course Outcome (COs):**

At the end of the course, the students would be able to;

Role of CADD in drug discovery  Different CADD techniques and their applications

Various strategies to design and develop new drug like molecules.  Working with molecular modeling softwares to design new drug molecules  The in silico virtual screening protocols

CO1	understand role of CADD in drug discovery.										
CO2	summarize different CADD techniques and their applications										
CO3	comprehend various strategies to design and develop new drug like molecules										
CO4	describe in silico virtual screening protocols and molecular modeling softwares.										

### **Course Articulation Matrix:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	-	-	-	-	-	-	-	-	-	3
CO2	3	-	-	-	-	-	-	-	-	-	3
CO3	3	-	-	-	-	-	-	-	-	-	3
CO4	3	-	-	3	-	-	-	-	-	-	3

### **Recommended Study Material:**

❖ **Textbook:**

1. Computational and structural approaches to drug discovery, Robert M Stroud and Janet. F Moore, RCS Publishers.
2. Introduction to Quantitative Drug Design by Y.C. Martin, CRC Press, Taylor & Francis group.
3. Drug Design by Ariens Volume 1 to 10, Academic Press, 1975, Elsevier Publishers.
4. Principles of Drug Design by Smith and Williams, CRC Press, Taylor & Francis.
5. The Organic Chemistry of the Drug Design and Drug action by Richard B. Silverman, Elsevier Publishers.
6. Medicinal Chemistry by Burger, Wiley Publishing Co.
7. An Introduction to Medicinal Chemistry –Graham L. Patrick, Oxford University Press.
8. Wilson and Gisvold's Text book of Organic Medicinal and Pharmaceutical Chemistry, Ippincott Williams & Wilkins.
9. Comprehensive Medicinal Chemistry – Corwin and Hansch, Pergamon Publishers.
10. Computational and structural approaches to drug design edited by Robert M Stroud and Janet. F Moore.

**FACULTY OF PHARMACY**  
**MASTER OF PHARMACY PROGRAMME**  
**PHPCM009: PHARMACEUTICAL PROCESS CHEMISTRY (Theory)**

---

**Total hours: 60 Hr**

**Outline of the course:**

Sr. No.	Title of the unit	Minimum number of hours
1	Process Chemistry	12
2	Unit operations	12
3	Unit Processes – I	12
4	Unit Processes – II	12
5	Industrial Safety	12

**Detailed Syllabus:**

Sr. No.	UNIT	Hours	Weightage (%)
1. <b>Process Chemistry</b>	Introduction, Synthetic strategy Stages of scale up process: Bench, pilot and large scale process. In-process control and validation of large scale process. Case studies of some scale up process of APIs. Impurities in API, types and their sources including genotoxic impurities	12	20%
2. <b>Unit operations</b>	a) Extraction: Liquid equilibria, extraction with reflux, extraction with agitation, counter current extraction. b) Filtration: Theory of filtration, pressure and vacuum filtration, centrifugal filtration. c) Distillation: azeotropic and steam distillation	12	20%

	d) Evaporation: Types of evaporators, factors affecting evaporation.  e) Crystallization: Crystallization from aqueous, non-aqueous solutions factors affecting crystallization, nucleation. Principle and general methods of Preparation of polymorphs, hydrates, solvates and amorphous APIs.		
--	---	--	--

<b>3.</b>	<b>Unit Processes – I</b>	<b>12</b>	<b>20%</b>
	a) Nitration: Nitrating agents, Aromatic nitration, kinetics and mechanism of aromatic nitration, process equipment for technical nitration, mixed acid for nitration.  b) Halogenation: Kinetics of halogenations, types of halogenations, catalytic halogenations. Case study on industrial halogenation process.  c) Oxidation: Introduction, types of oxidative reactions, Liquid phase oxidation with oxidizing agents. Non-metallic Oxidizing agents such as  d) H <sub>2</sub> O <sub>2</sub> , sodium hypochlorite, Oxygen gas, ozonolysis.		
<b>4.</b>	<b>Unit Processes – II</b>	<b>12</b>	<b>20%</b>
	a) Reduction: Catalytic hydrogenation, Heterogeneous and homogeneous catalyst; Hydrogen transfer reactions, Metal hydrides. Case study on industrial reduction process.  b) Fermentation: Aerobic and anaerobic fermentation. Production of i. Antibiotics; Penicillin and Streptomycin, ii. Vitamins: B2 and B12 iii. Statins: Lovastatin, Simvastatin  c) Reaction progress kinetic analysis i. Streamlining reaction steps, route selection, ii. Characteristics of expedient routes, characteristics of cost-effective routes, reagent selection, families of reagents useful for scale-up.		

<b>5.</b>	<b>Industrial Safety</b>	<b>12</b>	<b>20%</b>
	a) MSDS (Material Safety Data Sheet), hazard labels of chemicals and Personal Protection Equipment (PPE) b) Fire hazards, types of fire & fire extinguishers c) Occupational Health & Safety Assessment Series 1800 (OHSAS-1800) and ISO-14001(Environmental Management System), Effluents and its management		

### **Course Outcome (COs):**

At the end of the course, the students would be able to;

The strategies of scale up process of apis and intermediates  The various unit operations and various reactions in process chemistry

CO1	describe the strategies of scale up process of APIs and intermediates.
CO2	summarize various unit operations and various reactions in process chemistry.
CO3	comprehend hazard and safety management of chemical and equipment.

### **Course Articulation Matrix:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	-	-	-	-	-	-	-	-	-	3
CO2	3	-	-	-	-	-	-	-	-	-	3
CO3	3	-	-	-	-	-	-	-	-	3	3

## **Recommended Study Material:**

### **❖ Textbook:**

1. Process Chemistry in the Pharmaceutical Industry: Challenges in an Ever Changing Climate-An Overview; K. Gadamasetti, CRC Press.
2. Pharmaceutical Manufacturing Encyclopedia, 3<sup>rd</sup> edition, Volume 2.
3. Medicinal Chemistry by Burger, 6<sup>th</sup> edition, Volume 1-8.
4. W.L. McCabe, J.C Smith, Peter Harriott. Unit operations of chemical engineering, 7<sup>th</sup> edition, McGraw Hill
5. Polymorphism in Pharmaceutical Solids .Dekker Series Volume 95 Ed: H G Brittain (1999)
6. Regina M. Murphy: Introduction to Chemical Processes: Principles, Analysis, Synthesis
7. Peter J. Harrington: Pharmaceutical Process Chemistry for Synthesis: Rethinking the Routes to Scale-Up
8. P.H. Groggins: Unit processes in organic synthesis (MGH)
9. F.A. Henglein: Chemical Technology (Pergamon)
10. M. Gopal: Dryden's Outlines of Chemical Technology, WEP East-West Press
11. Clausen, Mattson: Principle of Industrial Chemistry, Wiley Publishing Co.,
12. Lowenheim & M.K. Moran: Industrial Chemicals
13. S.D. Shukla & G.N. Pandey: A text book of Chemical Technology Vol. II, Vikas Publishing House
14. J.K. Stille: Industrial Organic Chemistry (PH)
15. Shreve: Chemical Process, Mc Grawhill.
16. B.K. Sharma: Industrial Chemistry, Goel Publishing House
17. ICH Guidelines
18. United States Food and Drug Administration official website [www.fda.gov](http://www.fda.gov)

**FACULTY OF PHARMACY**  
**MASTER OF PHARMACY PROGRAMME**  
**PHPCM010: PHARMACEUTICAL CHEMISTRY PRACTICAL-II**  
**(Practical)**

---

**Total hours: 180 Hr**

**Outline of the course:**

Sr. No.	Title of the unit
1	Synthesis of organic compounds by adapting different approaches involving (3 experiments) a) Oxidation b) Reduction/hydrogenation c) Nitration
2	Comparative study of synthesis of APIs/intermediates by different synthetic routes (2 experiments)
3	Assignments on regulatory requirements in API (2 experiments)
4	Comparison of absorption spectra by UV and Wood ward – Fieser rule
5	Interpretation of organic compounds by FT-IR.
6	Interpretation of organic compounds by MASS
7	Interpretation of organic compounds by NMR
8	Determination of purity by DSC in pharmaceuticals
9	Identification of organic compounds using FT-IR, NMR, CNMR and Mass spectra.
10	To carry out the preparation of following organic compounds a. Preparation of 4-chlorobenzhydrylpiperazine. (an intermediate for cetirizine HCl). b. Preparation of 4-iodotolene from p-toluidine. c. NaBH <sub>4</sub> reduction of vanillin to vanillyl alcohol d. Preparation of umbelliferone by Pechhman reaction e. Preparation of triphenyl imidazole
11	To perform the Microwave irradiated reactions of synthetic importance (Any two) such as phenytoin and Biginelii compound.

12	Determination of log P, MR, hydrogen bond donors and acceptors of selected drugs using software
13	Calculation of ADMET properties of drug molecules and its analysis using software.
14	Pharmacophore modelling based experiment
15	2D-QSAR and 3D QSAR based experiments
16	Docking study and virtual screening based experiment

### **Course Outcome (COs):**

At the end of the course, the students would be able to;

CO1	elucidate organic compound by spectroscopic techniques.
CO2	synthesize various APIs and intermediates by conventional and green chemistry approach
CO3	perform and interpret in silico ADMET properties of organic compounds
CO4	perform virtual screening and pharmacophore based experiment
CO5	analyze the problem, communicate suggested solution and interpret the results

### **Course Articulation Matrix:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	-	3	-	-	-	-	-	-	-	3
CO2	3	-	-	-	-	-	-	-	-	3	3
CO3	3	-	3	3	-	-	-	-	-	-	3
CO4	3	-	3	3	-	-	-	-	-	-	3
CO5	3	-	3	-	-	-	-	3	-	-	3

## **Recommended Study Material:**

### **❖ Textbook:**

1. "Advanced Organic chemistry, Reaction, Mechanisms and Structure", J March, John Wiley and Sons, New York.
2. "Mechanism and Structure in Organic Chemistry", ES Gould, Hold Rinchart and Winston, New York.
3. "Organic Chemistry" Clayden, Greeves, Warren and Wothers., Oxford University Press 2001.
4. "Organic Chemistry" Vol I and II. I.L. Finar. ELBS, Pearson Education Lts, Dorling Kindersley 9 India) Pvt. Ltd.
5. A guide to mechanisms in Organic Chemistry, Peter Skyes (Orient Longman, New Delhi).
6. Reactive Intermediates in Organic Chemistry, Tandom and Gowel, Oxford & IBH Publishers.
7. Combinational Chemistry – Synthesis and applications – Stephen R Wilson & Anthony W Czarnik, Wiley – Blackwell.
8. Carey, Organic Chemistry, 5<sup>th</sup> Edition (Viva Books Pvt. Ltd.)
9. Organic Synthesis - The Disconnection Approach, S. Warren, Wily India
10. Principles of Organic Synthesis, ROC Norman and JM Coxan, Nelson Thorns.

# **CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY**

FACULTY OF MANAGEMENT STUDIES

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

**HS106.02 B: ACADEMIC WRITING**

## **I. Credits and Schemes:**

Sem	Course Code	Course Name	Credits	Teaching Scheme Contact Hours/Week	Evaluation Scheme				Total
					Theory		Practical		
					Internal	External	Internal	External	
II	HS106.02 B	Academic Writing	02	02	--	--	30	70	100

## **II. Course Outline**

Module No.	Title / Topic	Classroom Contact Hours
1	<b>Academic Writing and Research Process</b> <ul style="list-style-type: none"> <li>• <i>Introduction to Academic Writing</i></li> <li>• <i>Academic Writing as a Part of Research</i></li> <li>• <i>Types of Academic Writing</i></li> <li>• <i>Features of Academic Writing</i></li> <li>• <i>Importance of Good Academic Writing in various Academic Works</i></li> </ul>	<b>05</b>
2	<b>Anatomy of Academic Writing</b> <ul style="list-style-type: none"> <li>• <i>Academic Vocabulary</i></li> <li>• <i>Simple and Complex Sentences</i></li> <li>• <i>Organizing Paragraphs</i></li> <li>• <i>The Writing Process</i></li> <li>• <i>Adopting Academic Writing Style</i></li> </ul>	<b>05</b>

<b>3</b>	<b>Key Academic Skills</b> <ul style="list-style-type: none"> <li>• Note – taking</li> <li>• Note – making</li> <li>• Paraphrasing</li> <li>• Summarizing</li> </ul>	<b>05</b>
<b>4</b>	<b>Accuracy in Academic Writing</b> <ul style="list-style-type: none"> <li>• <i>Lexical Range</i></li> <li>• <i>Academic Language and Structures</i></li> <li>• <i>Elements of Writing</i></li> <li>• <i>Proof Reading, Editing, and Rewriting</i></li> </ul>	<b>05</b>
<b>5</b>	<b>Using and Citing Sources of Ideas</b> <ul style="list-style-type: none"> <li>• <i>Academic Texts and their Types</i></li> <li>• <i>Intellectual Honesty in Academic Writing</i></li> <li>• <i>Avoiding Plagiarism – Idea Theft</i></li> <li>• <i>Degrees of Plagiarism</i></li> <li>• <i>Types of Borrowing</i></li> <li>• <i>Anatomy of Citations</i></li> <li>• <i>Common Citation Styles</i></li> </ul>	<b>05</b>
<b>6</b>	<b>Contemporary Practices in Academic Writing</b> <ul style="list-style-type: none"> <li>• Analytical Essays</li> <li>• Graph / Table / Process Interpretation and Description</li> <li>• Writing Reports</li> <li>• Writing Research / Concept Papers</li> </ul>	<b>05</b>
<b>Total</b>		<b>30</b>

### **III. Instruction Methods and Pedagogy**

The course is based on practical learning. Teaching will be facilitated by reading material, discussion, task-based learning, projects, assignments and various interpersonal activities like writing, group work, independent and collaborative research, etc.

#### **IV. Evaluation**

The students will be evaluated continuously in the form of their consistent performance throughout the semester. There is no theoretical evaluation. There is just practical evaluation. The evaluation (practical) is schemed as 30 marks for internal evaluation and 70 marks for external evaluation.

##### **Internal Evaluation**

The students' performance in the course will be evaluated on a continuous basis through the following components:

<b>Sl. No.</b>	<b>Component</b>	<b>Number</b>	<b>Marks per incidence</b>	<b>Total Marks</b>
1	Paragraph Writing	1	3	03
2	Note-taking / Note-making	1	3	03
3	Paraphrasing / Summarizing	1	4	04
4	Essay Writing	1	5	05
5	Concept Paper Writing	1	10	10
5	Attendance and Class Participation			05
<b>Total</b>				<b>30</b>

##### **External Evaluation**

The University Practical Examination will be for 70 marks and will test the professional communication skills and academic writing skills of the students.

<b>Sl. No.</b>	<b>Component</b>	<b>Number</b>	<b>Marks per incidence</b>	<b>Total Marks</b>
1	Viva / Practical /Quiz/ Project / Academic Writing	-	70	70
<b>Total</b>				<b>70</b>

##### **Course Outcome (COs):**

After completion of the course, the student would:

CO1	have sound understanding of the concept and applications of academic writing
CO2	have acquired enough knowledge of academic writing style, strategy and approach
CO3	be able to demonstrate error free and effective academic writing

CO4	be able to demonstrate ability to work on project/report/paper writing
CO5	understand the concept of plagiarism and learn to use different citation styles as a part of referencing

### Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	-	-	-	-	3	-	-	-
CO2	-	-	-	-	-	-	-	3	-	-	-
CO3	-	-	-	-	-	-	-	3	-	-	-
CO4	-	-	-	-	-	-	-	3	-	-	-
CO5	-	-	-	-	-	-	2	-	-	-	-

Correlation levels 1, 2 or 3 are as defined below:

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

### V. Reference Books / Reading

#### Essential Reading for

#### Concepts

- Academic Writing for International Students, Routledge
- Academic Writing: A Guide for Management Students and Researchers. Monipally, M. M. & Pawar, B. S. Sage. 2010. New Delhi

#### Essential Reading for Activity and Teacher Resource

- *Effective Academic Writing Level - 1,2,3,4 (Second Edition)* By: Alice Savage, Patricia Mayer, Masoud Shafiei, Rhonda Liss, & Jason Davis; Publisher: Oxford

#### Additional Reading

- Writing Your Thesis (2<sup>nd</sup> Edition) by Paul Oliver, Sage
- Development Communication In Practice by Vilanilam V J, Sage
- Intercultural Communication by Mingsheng Li, Patel Fay, Sage
- [www.owl.psu.edu](http://www.owl.psu.edu).

**FACULTY OF PHARMACY  
Master of Pharmacy Programme**

**Syllabi  
Semester  
III**

**Charotar University of Science and Technology**

**FACULTY OF PHARMACY**  
**MASTER OF PHARMACY PROGRAMME**  
**PHCCC010 : RESEARCH METHODOLOGY & BIOSTATISTICS**

---

**Total hours: 60**

**UNIT – I General Research Methodology:** **12 hr**

Research, objective, requirements, practical difficulties, review of literature, study design, types of studies, strategies to eliminate errors/bias, controls, randomization, crossover design, placebo, blinding techniques.

**UNIT – II Biostatistics:** **12 hr**

Definition, application, sample size, importance of sample size, factors influencing sample size, dropouts, statistical tests of significance, type of significance tests, parametric tests(students “t” test, ANOVA, Correlation coefficient, regression), non-parametric tests (wilcoxon rank tests, analysis of variance, correlation, chi square test), null hypothesis, P values, degree of freedom, interpretation of P values.

**UNIT – III Medical Research:** **12 hr**

History, values in medical ethics, autonomy, beneficence, non-maleficence, double effect, conflicts between autonomy and beneficence/non-maleficence, euthanasia, informed consent, confidentiality, criticisms of orthodox medical ethics, importance of communication, control resolution, guidelines, ethics committees, cultural concerns, truth telling, online business practices, conflicts of interest, referral, vendor relationships, treatment of family members, sexual relationships, fatality.

**UNIT – IV CPCSEA guidelines for laboratory animal facility:** **12 hr**

Goals, veterinary care, quarantine, surveillance, diagnosis, treatment and control of disease, personal hygiene, location of animal facilities to laboratories, anesthesia, euthanasia, physical facilities, environment, animal husbandry, record keeping, SOPs, personnel and training, transport of lab animals.

**UNIT – V Declaration of Helsinki:** **12 hr**

History, introduction, basic principles for all medical research, and additional principles for medical research combined with medical care.

## **A. Recommended Study Material:**

### **❖ Text Books:**

1. Research Methodology, Methods & Techniques, C.R. Kothari, Viswa Prakashan, 2nd Edition, 2009.
2. Research Methods- A Process of Inquiry, Graziano, A.M., Raulin, M.L, Pearson Publications, 7th Edition, 2009.
3. How to Write a Thesis:, Murray, R. Tata McGraw Hill, 2nd Edition, 2010.
4. Writing For Academic Journals, Murray, R., McGraw Hill International, 2009.
5. Writing for Publication, Henson, K.T., Allyn &Bacon, 2005.

### **❖ Reference Books:**

1. What is this thing called Science, Chalmers, A.F., Queensland University Press, 1999.
2. Methods &Techniques of Social Research, Bhandarkar & Wilkinson, Himalaya publications, 2009.
3. Doing your Research project, Bell J., Open University Press, Berkshire, 4thEdition, 2005
4. A Handbook of Academic Writing, Murray, R. and Moore, S., Tata McGraw Hill International, 2006.

**FACULTY OF PHARMACY**  
**MASTER OF PHARMACY PROGRAMME**  
**PHPCM013: RESEARCH WORK-I**

---

**Total hours: 480**

**Course Outcome (COs):**

At the end of the course, the students would be able to

<b>CO1</b>	define and describe research problem.
<b>CO2</b>	illustrate project management skills such as project design, scientific information and literature access, project implementation, data analysis, and interpretation.
<b>CO3</b>	present a dissertation report integrating appropriate written and verbal communicative skills.
<b>CO4</b>	efficiently use communication and information technology tools.

**Course Articulation Matrix:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	-	-	-	-	-	-	-	-	-	3
CO2	3	3	3	3	-	-	-	-	-	-	3
CO3	3	-	3	3	-	-	-	-	-	-	3
CO4	3	-	-	-	-	-	3	3	-	-	3

**FACULTY OF PHARMACY**  
**MASTER OF PHARMACY PROGRAMME**  
**PHCCC011: JOURNAL CLUB -I**

---

**Total hours: 30**

**Course Outcome (COs):**

At the end of the course, the students would be able to

	<b>CO</b>
<b>CO1</b>	present scientific literature and interpret the finding

**Course Articulation Matrix:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	-	3	3	-	-	-	3	-	-	3

**FACULTY OF PHARMACY**  
**Master of Pharmacy Programme**

**Syllabi  
Semester  
IV**

**Charotar University of Science and Technology**

**FACULTY OF PHARMACY**  
**MASTER OF PHARMACY PROGRAMME**  
**PHPCM015 : RESEARCH WORK-II**

---

**Total hours: 480**

**Course Outcome (COs):**

At the end of the course, the students would be able to

<b>CO1</b>	define and describe research problem.
<b>CO2</b>	illustrate project management skills such as project design, scientific information and literature access, project implementation, data analysis, and interpretation.
<b>CO3</b>	present a dissertation report integrating appropriate written and verbal communicative skills.
<b>CO4</b>	efficiently use communication and information technology tools.

**Course Articulation Matrix:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	-	-	-	-	-	-	-	-	-	3
CO2	3	3	3	3	-	-	-	-	-	-	3
CO3	3	-	3	3	-	-	-	-	-	-	3
CO4	3	-	-	-	-	-	3	3	-	-	3

**FACULTY OF PHARMACY**  
**MASTER OF PHARMACY PROGRAMME**  
**PHCCC012: JOURNAL CLUB -II**

---

**Total hours: 30**

**Course Outcome (COs):**

At the end of the course, the students would be able to

	<b>CO</b>
<b>CO1</b>	present scientific literature and interpret the finding

**Course Articulation Matrix:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	-	3	3	-	-	-	3	-	-	3

### **1.3 Learning Resources**

Students can utilize library at RPCP or CHARUSAT Knowledge Resource Centre ( situated in building A1)

## 1.4 Academic Calendar:

Ramanbhai Patel College of Pharmacy Charotar University of Science & Technology Tentative Planning for Academic Year: 2025-2026 (Odd semester-1st Sem M.Pharm.)					
Week	Date	Day	No. of working days	WD/HD	Activity
1	03.10.2025	Fri	2	WD	<b><u>COMMENCEMENT OF 1st SEMESTER OF M.Pharm.</u></b>
	04.10.2025	Sat		WD	Teaching-Learning for 1st sem M.Pharm.
	05.10.2025	Sun		HD	
2	06.10.2025	Mon	6	WD	Teaching-Learning for 1st sem M.Pharm.
	07.10.2025	Tue		WD	
	08.10.2025	Wed		WD	
	09.10.2025	Thu		WD	
	10.10.2025	Fri		WD	
	11.10.2025	Sat		WD	
	12.10.2025	Sun		HD	
3	13.10.2025	Mon	5	WD	Teaching-Learning for 1st sem M.Pharm.
	14.10.2025	Tue		WD	
	15.10.2025	Wed		WD	
	16.10.2025	Thu		WD	
	17.10.2025	Fri		WD	
	18.10.2025	Sat		HD	
	19.10.2025	Sun		HD	
4	20.10.2025	Mon	0	HD	<b><u>Diwali vacation</u></b>
	21.10.2025	Tue		HD	
	22.10.2025	Wed		HD	
	23.10.2025	Thu		HD	
	24.10.2025	Fri		HD	
	25.10.2025	Sat		HD	
	26.10.2025	Sun		HD	
5	27.10.2025	Mon	6	WD	
	28.10.2025	Tue		WD	

	29.10.2025	Wed		WD	-
	30.10.2025	Thu		WD	Teaching-Learning for 1st sem M.Pharm.
	31.10.2025	Fri		WD	-
	01.11.2025	Sat		WD	-
	02.11.2025	Sun		HD	-
6	03.11.2025	Mon	5	WD	-
	04.11.2025	Tue		WD	-
	05.11.2025	Wed		HD	<b>Guru Nanak Jayanti</b>
	06.11.2025	Thu		WD	Teaching-Learning for 1st sem M.Pharm.
	07.11.2025	Fri		WD	-
	08.11.2025	Sat		WD	-
	09.11.2025	Sun		HD	-
	10.11.2025	Mon		WD	-
7	11.11.2025	Tue		WD	-
	12.11.2025	Wed		WD	-
	13.11.2025	Thu		WD	Teaching-Learning for 1st sem M.Pharm.
	14.11.2025	Fri		WD	-
	15.11.2025	Sat		WD	-
	16.11.2025	Sun		HD	-
	17.11.2025	Mon	6	WD	-
8	18.11.2025	Tue		WD	-
	19.11.2025	Wed		WD	Teaching-Learning for 1st sem M.Pharm.
	20.11.2025	Thu		WD	-
	21.11.2025	Fri		WD	-
	22.11.2025	Sat		WD	-
	23.11.2025	Sun		HD	-
	24.11.2025	Mon		WD	<b>1st Internal Examination (T/P)</b>
9	25.11.2025	Tue		WD	
	26.11.2025	Wed		WD	
	27.11.2025	Thu		WD	
	28.11.2025	Fri		WD	
	29.11.2025	Sat		WD	
	30.11.2025	Sun		HD	
	01.12.2025	Mon	6	WD	
10	02.12.2025	Tue		WD	
	03.12.2025	Wed		WD	
	04.12.2025	Thu		WD	
	05.12.2025	Fri		WD	
	06.12.2025	Sat		WD	
	07.12.2025	Sun		HD	

11	08.12.2025	Mon	6	WD	Teaching-Learning for 1st sem M.Pharm.
	09.12.2025	Tue		WD	
	10.12.2025	Wed		WD	
	11.12.2025	Thu		WD	
	12.12.2025	Fri		WD	
	13.12.2025	Sat		WD	
	14.12.2025	Sun		HD	
12	15.12.2025	Mon	6	WD	Teaching-Learning for 1st sem M.Pharm.
	16.12.2025	Tue		WD	
	17.12.2025	Wed		WD	
	18.12.2025	Thu		WD	
	19.12.2025	Fri		WD	
	20.12.2025	Sat		WD	
	21.12.2025	Sun		HD	
13	22.12.2025	Mon	5	WD	Teaching-Learning for 1st sem M.Pharm. <u>Christmas</u>
	23.12.2025	Tue		WD	
	24.12.2025	Wed		WD	
	25.12.2025	Thu		HD	
	26.12.2025	Fri		WD	
	27.12.2025	Sat		WD	
	28.12.2025	Sun		HD	
14	29.12.2025	Mon	6	WD	Teaching-Learning for 1st sem M.Pharm.
	30.12.2025	Tue		WD	
	31.12.2025	Wed		WD	
	01.01.2026	Thu		WD	
	02.01.2026	Fri		WD	
	03.01.2026	Sat		WD	
	04.01.2026	Sun		HD	
15	05.01.2026	Mon	6	WD	Teaching-Learning for 1st sem M.Pharm.
	06.01.2026	Tue		WD	
	07.01.2026	Wed		WD	
	08.01.2026	Thu		WD	
	09.01.2026	Fri		WD	
	10.01.2026	Sat		WD	
	11.01.2026	Sun		HD	
16	12.01.2026	Mon	4	WD	<u>2nd Internal Examination (P)</u> <u>Makar Sankranti (Uttarayan)</u>
	13.01.2026	Tue		WD	
	14.01.2026	Wed		HD	
	15.01.2026	Thu		HD	
	16.01.2026	Fri		WD	
	17.01.2026	Sat		WD	
					Teaching-Learning for 1st sem M.Pharm.

	18.01.2026	Sun		HD		
17	19.01.2026	Mon	6	WD	<b><u>2nd Internal Examination (T)</u></b> Teaching-Learning for 1st sem M.Pharm.	
	20.01.2026	Tue		WD		
	21.01.2026	Wed		WD		
	22.01.2026	Thu		WD		
	23.01.2026	Fri		WD		
	24.01.2026	Sat		WD		
	25.01.2026	Sun		HD		
18	26.01.2026	Mon	5	HD	<b><u>Republic Day</u></b> Teaching-Learning for 1st sem M.Pharm.	
	27.01.2026	Tue		WD		
	28.01.2026	Wed		WD		
	29.01.2026	Thu		WD		
	30.01.2026	Fri		WD		
	31.01.2026	Sat		WD		
	01.02.2026	Sun		HD		
19	02.02.2026	Mon	6	WD	<b><u>Journal Certification</u></b> Teaching-Learning for 1st sem M.Pharm.	
	03.02.2026	Tue		WD		
	04.02.2026	Wed		WD		
	05.02.2026	Thu		WD		
	06.02.2026	Fri		WD		
	07.02.2026	Sat		WD		
	08.02.2026	Sun		HD		
20	09.02.2026	Mon	6	WD	<b><u>CHARUSAT EXAMINATION</u></b> <b><u>(T/P)</u></b>	
	10.02.2026	Tue		WD		
	11.02.2026	Wed		WD		
	12.02.2026	Thu		WD		
	13.02.2026	Fri		WD		
	14.02.2026	Sat		WD		
	15.02.2026	Sun		HD		
21	16.02.2026	Mon	6	WD	<b><u>CHARUSAT EXAMINATION</u></b> <b><u>(T/P)</u></b>	
	17.02.2026	Tue		WD		
	18.02.2026	Wed		WD		
	19.02.2026	Thu		WD		
	20.02.2026	Fri		WD		
	21.02.2026	Sat		WD		
	22.02.2026	Sun		HD		
22	16.02.2026	Mon	6	WD		
	17.02.2026	Tue		WD		
	18.02.2026	Wed		WD		
	19.02.2026	Thu		WD		
	20.02.2026	Fri		WD		

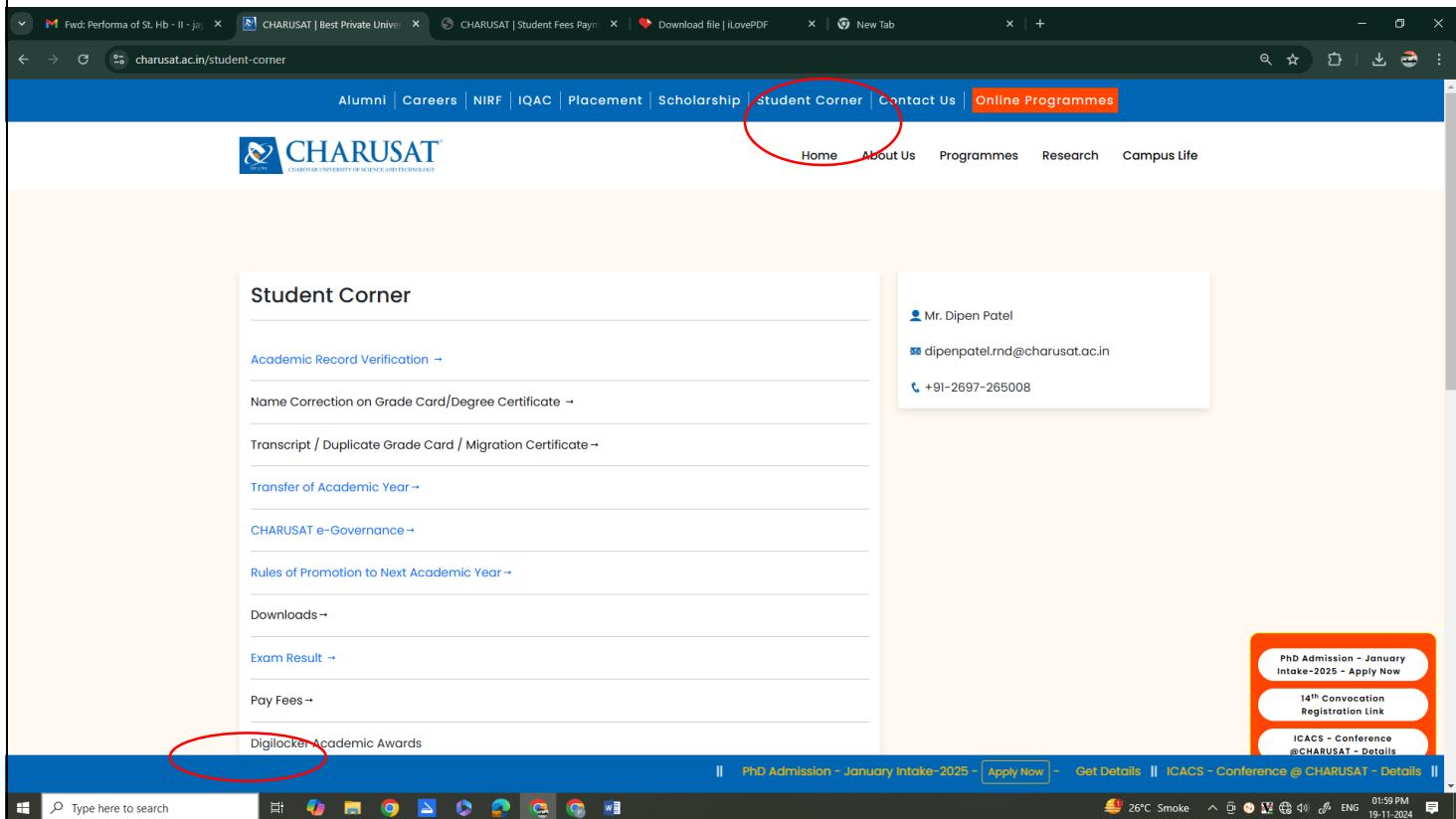
	21.02.2026	Sat		WD	
	22.02.2026	Sun		HD	
			116		
<b>* Schedule is tentative, subject to change</b>					

## **SECTION - 2**

# **VARIOUS ADMINISTRATIVE PROCESS**

## 2.1 Payment of tuition fees or Other charges

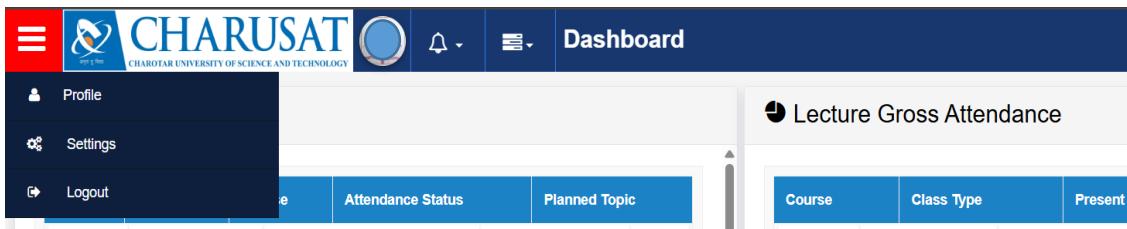
Step:1	Visit University web-portal click on Pay Fees: <a href="https://charusat.edu.in:912/FeesPaymentApp/">https://charusat.edu.in:912/FeesPaymentApp/</a>
Step:2	Enter your Student ID and Pay your Fees
Step:3	Download your fees receipt



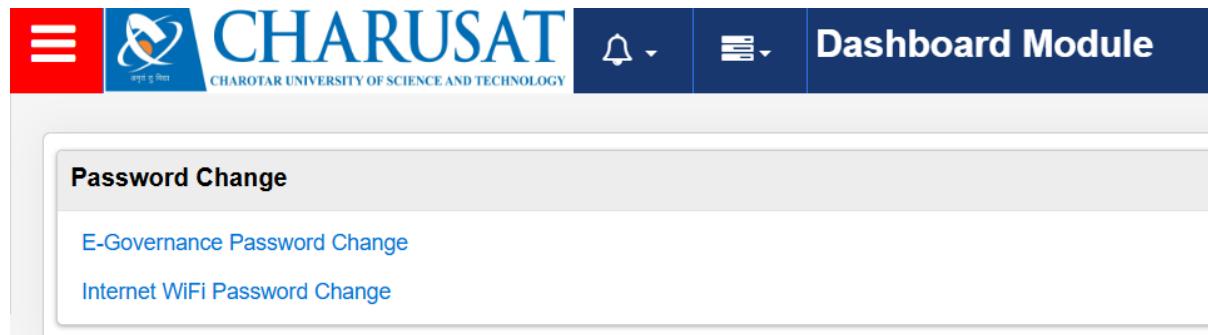
The screenshot shows a browser window with multiple tabs open. The active tab displays the CHARUSAT website at [charusat.ac.in/student-corner](http://charusat.ac.in/student-corner). The page header includes links for Alumni, Careers, NIRF, IQAC, Placement, Scholarship, Student Corner (which is circled in red), Contact Us, and Online Programmes. Below the header, the CHARUSAT logo is visible, along with navigation links for Home, About Us, Programmes, Research, and Campus Life. The main content area is titled "Student Corner" and lists several options: Academic Record Verification, Name Correction on Grade Card/Degree Certificate, Transcript / Duplicate Grade Card / Migration Certificate, Transfer of Academic Year, CHARUSAT e-Governance, Rules of Promotion to Next Academic Year, Downloads, Exam Result, Pay Fees, and Digilocker Academic Awards (which is also circled in red). To the right of the main content, there is a sidebar with contact information for Mr. Dipen Patel (dipenpatel.rnd@charusat.ac.in, +91-2697-265008) and a red box containing links for PhD Admission, 14th Convocation Registration, and ICACS Conference details.

## 2.2 Process of Acquiring WIFI access

1. Go to e-governance website
  - a. <http://egov.charusat/>
2. Login into your student account using e-governance login credentials
3. Go to settings tab as how in picture below



4. Click on Internet WiFi password change



5. Change the password to get access to WiFi
  6. Save and remember your password
- Connect to wifi by authenticating your credentials on  
<http://172.16.0.1:8090/httpclient.html>

## **2.3 Process to obtain required Certificate from the institute**

Step:1	Visit Administrative office of RPCP
Step:2	Submit an application as per your requirement along with your ID Number (via Email: <a href="mailto:principal.rpcp@charusat.ac.in">principal.rpcp@charusat.ac.in</a> )
Step:3	Collect certificate form Administrative office (Room no: 129A, RPCP)

## **2.4 Process to obtain required Certificate from the university office**

- In order to obtain the required certificate at the University Level, students need to visit the Student Corner of the CHARUSAT University website. They can choose to apply online or offline and should ensure to include all necessary enclosures with their application. The application must be submitted to the Student Section of the University and should be duly attested by the relevant institute's HoD / Principal/ Dean. Once all the necessary procedures are completed, the certificate will be issued at the University office. (As per the below):

The screenshot shows the official website of CHARUSAT (Chitrakoot University of Science and Technology). The top navigation bar includes links for Alumni, Careers, NIRF, IQAC, Placement, Scholarship, Library-KRC, Student Corner, Contact Us, and Online Programmes. A search icon is also present. The main menu on the left under 'Student Corner' lists various services: Academic Record Verification, Name Correction on Grade Card/Degree Certificate, Transcript / Duplicate Grade Card / Migration Certificate, Transfer of Academic Year, CHARUSAT e-Governance, Rules of Promotion to Next Academic Year, Downloads, Exam Result, Pay Fees, Digilocker Academic Awards (with sub-links for Information, Create Digilocker Account, and Fetch Document), Wellness Program, Student Code of Conduct, Students' Satisfaction Survey, Students' NDML Academic depository, Syllabus & Academic Regulations, Hostel, Fellowship -UG | PG | PhD | PDF, Student Development Initiatives, and Student Fee Refund Policy.

**CHARUSAT**  
CHITRAKOOT UNIVERSITY OF SCIENCE AND TECHNOLOGY

Home About Us Programmes Research Campus Life Enquire Now – Admission 2025

**Student Corner**

- Academic Record Verification →
- Name Correction on Grade Card/Degree Certificate →
- Transcript / Duplicate Grade Card / Migration Certificate →
- Transfer of Academic Year →
- CHARUSAT e-Governance →
- Rules of Promotion to Next Academic Year →
- Downloads →
- Exam Result →
- Pay Fees →
- Digilocker Academic Awards
  - Information →
  - Create Digilocker Account →
  - Fetch Document →
- Wellness Program →
- Student Code of Conduct →
- Students' Satisfaction Survey →
- Students' NDML Academic depository →
- Syllabus & Academic Regulations →
- Hostel →
- Fellowship -UG | PG | PhD | PDF
- Student Development Initiatives →
- Student Fee Refund Policy →

Mr. Dipen Patel  
dipenpatelrnd@charusat.ac.in  
+91-2897-265008

## **2.5 to 2.7 Process to obtain Duplicate Grade Card / Name Correction in Grade Card / Transcript OR E-transcript / Migration Certificate**

Step:1	<p>Online Application Request through CHARUSAT Web Portal</p> <p><a href="https://www.charusat.ac.in/student-corner">https://www.charusat.ac.in/student-corner</a></p> <p>Select Transcript / Duplicate Grade Card / Migration Certificate</p> <p>Select Document Type</p> <p><b>Migration Certificate</b></p> <p><b>Transcript/E-Transcript / WES</b></p> <p><b>Duplicate Grade Card</b></p> <p>Enter CHARUSAT Student ID</p>
Step:2	<p>Pay fees at online</p> <p>Download Payment Receipt (for further Communication)</p>
	<p>University will get request after successful Payment (Time is depend on clearing of payment)</p>
Collect the certificate within 15 days	

**OR**

**Scan the below QR code**



**CHARUSAT**<sup>®</sup>  
CHAROTAR UNIVERSITY OF SCIENCE AND TECHNOLOGY



**SCAN TO APPLY FOR**

**e-transcript**

**Duplicate Grade Card**

**Migration Certificate**

Student will get an e-copy of the transcript on his/her  
CHARUSAT e-mail id within 48 hrs working after the successful payment

## **2.8 Process for Academic Document Verification by External Agency**

Step:1	Online Application Request through CHARUSAT Web Portal <a href="https://www.charusat.ac.in/student-corner">https://www.charusat.ac.in/student-corner</a>
Step:2	Select Academic Record Verification menu
Step:3	Fill required Information
Step:4	Make Payment
Step:5	Please email Transaction receipt, Student Academic Verification Details (Transcript / Degree Certificate/ Marksheets) after completing the payment process.  Email ID: <i>studentservices@charusat.ac.in</i> Email Subject: Academic Document Verification : < Student ID > : < Student Name >

**SECTION - 3**

**UNDERTAKINGS**

**AND**

**DECLARATIONS**

**UNDERTAKING**  
**(Observing Rules and Regulations of the University)**

**Roll No.** \_\_\_\_\_

I, Mr./Ms. \_\_\_\_\_

son/daughter of \_\_\_\_\_ have secured admission at the Indukaka Ipcowala Institute of Management of CHARUSAT University in the academic year \_\_\_\_\_ for the \_\_\_\_\_ Programme.

We hereby confirm that we have gone through the academic rules and regulations of the Institute very carefully and we assure you that we will abide by the same.

**Student Signature** : \_\_\_\_\_

**Name of the Parent/Guardian** : 1. \_\_\_\_\_

2. \_\_\_\_\_

**Signature of the Parent/Guardian** : 1. \_\_\_\_\_ 2. \_\_\_\_\_

## **DECLARATION** **(Code of Conducts and Disciplinary Rules)**

I ..... bearing roll no. ..... admitted in ..... (programme) of the Institute of....., CHARUSAT University, Changa do hereby declare and undertake that I will abide by the Code of Conduct, including rules for misconduct/indiscipline by the students, provisions like dress code on the campus, rules for maintaining vehicles on the campus, public display of affection (PDA), etiquette on the campus etc.

I will abide by all the rules and regulations as and when intimated by the university and if I am found violating any rules then, I shall be subjected to the major/minor penalties as may deemed fit by the university.

Signature : \_\_\_\_\_

Name of the Parent/Guardian : 1. \_\_\_\_\_  
2. \_\_\_\_\_

Signature of the Parent/Guardian : 1. \_\_\_\_\_ 2. \_\_\_\_\_

**UNDERTAKING**  
**(Observing Rules & Regulations of the Examination)**

I, ..... Roll No..... studying in the First year of ..... programme at Institute of ....., CHARUSAT University, Changa do hereby undertake that I have read and understood all the Rules & Regulations related to Academic Dishonesty at examinations/tests/assignments and punishment in case of using unfair means, I have also gone through the Academic Regulations related to Granting of Term and Cancellation of admission, and I shall observe, follow and abide by all these rules and regulations.

I shall abide by all the rules and regulations and if I am found violating any rules then, I shall be subjected to the necessary action/penalties as per provision of rules/regulations of the university.

Signature : \_\_\_\_\_

Name : \_\_\_\_\_

Address : \_\_\_\_\_

Signature of the Parent/Guardian : 1. \_\_\_\_\_ 2. \_\_\_\_\_

**UNDERTAKING**  
**(To Refrain from Consumption of Drugs and Alcohol)**

I, \_\_\_\_\_ bearing Roll No.\_\_\_\_\_ admitted in \_\_\_\_\_ (programme) at Institute of \_\_\_\_\_ do hereby declare and undertake that I will refrain myself from possession / consumption of Drugs and Alcohol.

I know that the use/possession of narcotics drugs and alcohol is a punishable offence under the law of the Government of Gujarat and if I am found guilty of using such thing/s, then it will amount to a criminal offence and I am liable for the appropriate penalty as per laws and also liable to cancel my admission from the university.

I hereby give an undertaking to the Institute that I will refrain myself from possession or consumption of Drugs and Alcohol in and around the campus.

Date : \_\_\_\_\_

Place : \_\_\_\_\_ Signature of Student

-----  
I undertake that I will take utmost care to see that my ward does not get involved in any such incident.

Name of the Parent/Guardian : 1. \_\_\_\_\_

2. \_\_\_\_\_

Signature of the Parent/Guardian : 1. \_\_\_\_\_ 2. \_\_\_\_\_

Address of Parent/ Guardian : \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Contact no of Parent/ Guardian : 1. \_\_\_\_\_ 2. \_\_\_\_\_

## 4. IMPORTANT CONTACTS

+91-02697-265011 (Last 4 digits: Extension number)

Name and Designation	Extension number & Email-id
Dr. Samir Patel Dean - Faculty of Pharmacy,	5161 dean.fph@charusat.ac.in
Dr. Manan Raval Principal, RPCP	5141 principal.rpcp@charusat.ac.in
Mr. Jaydeep Parmar P.A to Principal	5151 jaydepparmar.ph@charusat.ac.in
Dr. Meghna Mehta Librarian	5145 meghanamehta.ph@charusat.ac.in
Mr. Jaydeep Parmar Student Section, RPCP	5151 jaydepparmar.ph@charusat.ac.in
Shri Mukesh Yadav Dy. Registrar, Academic Section	5029 mukeshyadav.adm@charusat.ac.in
Ms. Manisha Patel Chief Finance Officer, Accounts Section	5007 cfo@charusat.ac.in
Shri Mitesh Patel Assistant Registrar, Students Section (University office)	5038 studentservices@charusat.ac.in
Dr. Abhilash Shukla Examination Section	----- abhilashshukla.mca@charusat.ac.in
Dr. Ritesh Patel Coordinator, E-governance	5251 coordinator.egov@charusat.ac.in
Shri Ritesh Bhatt WIN Cell Coordinator	5106 riteshbhatt.win@charusat.ac.in
Mr. Sujal Dadhaniya Corporate Development & Placement Cell	5213 tpo@charusat.ac.in,tnp@charusat.ac.in
Dr. Dilip Gosai Head, Charusat Rural Education Development Programme	5160 head.credp@charusat.ac.in
Dr. Gayatri Dave Chairperson, Women Development Cell	5197 gayatridave.bt@charusat.ac.in
Dr. Mrunali Patel Chairperson, Internal Complaint Committee	5163 chairperson.icc@charusat.ac.in
Dr. Vijay Panchal Head, Equal Opportunity Cell	5081 vijaypanchal.cv@charusat.ac.in
Shri Mukesh Patel Nodal Officer of Student Grievance Redressal Cell	5029 nodalofficergrc@charusat.ac.in
Dr. Vijaykumar Chaudhary Convenor, Anti-ragging Cell	5221 vijaychaudhary.me@charusat.ac.in