

“Social Transformation through Dynamic Education”



Bharati Vidyapeeth

(Deemed to be University), Pune

**YASHWANTRAO MOHITE COLLEGE OF ARTS, SCIENCE &
COMMERCE, Pune- 411 038**

Accredited with 'A+' Grade (2017) by NAAC, 'A' Grade University Status by MHRD,
Govt. of India, Accredited (2004) & Reaccredited (2011) with 'A' Grade by NAAC

M.Sc. Chemistry

Course Structure and Syllabus

(Faculty of Science)

Framed According to the National Education Policy (NEP -2020)

(To Be Implemented From Academic Year 2023-24)

1. Preamble:

Taking into consideration the rapid changes in science and technology and new approaches in different areas of Chemistry and related subjects, Board of studies in Chemistry after a thorough discussion with the teachers of Chemistry and experts from other Academic institutions has prepared the syllabus of M.Sc.(Analytical / Organic Chemistry) course as per NEP-2020.

The present syllabus aims at developing knowledge, skills and interest of the learner in the subject of Chemistry. The faculty is expected to use their knowledge, experience and skills to develop interest in learners towards the subject of Chemistry. The classroom course and laboratory work are designed taking into consideration the needs and competence level of the students. The ultimate aim of this course is to ensure that learners develop basic knowledge and skill sets in the subject of Chemistry

2. Introduction:

The main objective of this programme is to impart the key knowledge of chemical sciences and expertise to prepare students for careers in chemistry with high scientific depth and temperament and to prepare quality postgraduates for further research and development and entrepreneurship. To achieve goal, it is imperative that their educational training is improved such that it incorporates the use of newer technologies, use of newer assessment tools for mid-course corrections to make sure that they become competitive individuals to shoulder newer social responsibilities and are capable of undertaking novel innovations in their areas of expertise. The syllabus offers a flexibility of programme structure while ensuring that students get a strong foundation and gains in-depth knowledge in chemistry. The LOCF strategy gives students a clear view to focus their learning efforts and enable them to make a choice of the elective courses they prefer to study. The syllabus fulfils the current needs to acquire a good chemistry degree and to secure a good choice in higher education in chemistry and the area of their interest as well as employment.

3. Learning Outcomes based approach:

Learning Outcome based approach to curriculum planning (LOCF) is almost a paradigm shift in the whole gamut of higher education such that it is based on first and for the most identifying the outcomes of the learning required for a particular subject of study, and then planning all components of higher education so as to achieve these outcomes. The learning outcomes are the focal point of the reference to which all planning and evaluation of the end learning is compared and further modifications are made to fully optimize the education of the individuals in a particular subject. The students are also trained in such a way that they develop critical thinking and problem solving as related to the chemistry. The curriculum developed and the teaching and the evaluation tasks are such that the students are able to apply their knowledge and training of chemistry to solve the problems of chemistry as these exist or appear from time to time in the society. The curriculum envisions that the student, once postgraduate as specialists in a discipline, have an important role to play in the newer developments and innovations in the future in the subject for advancement of the discipline.

4. Postgraduate Attributes in Chemistry:

- Students will be able to clearly communicate the results of scientific work in oral, written and ICT formats to both science community and society.
- Students will be able to explain why chemistry is an integral activity for addressing social, economic and environmental problems.
- Students will learn to act with integrity and good ethics in their profession and their obligation to society.
- Students will be able to demonstrate knowledge and skills in analyzing and identifying entrepreneur opportunities.
- Broaden the outlook and attitude, develop the current skills and abilities, learn new one to excel in studies and career, grow in to responsible global citizens.
- Demonstrate behavioral attributes for the enhancement of soft skills, socialistic approach and leadership qualities for successful career and nurture responsible human being.

5. Qualification Descriptors:

The following may serve as the important qualification descriptors for a PG degree in Chemistry:

1. Gains comprehensive knowledge and understanding on fundamental principles and concepts of chemical sciences that covers the sub-disciplines (Physical, Inorganic and

Organic) as well as advanced and emerging topics.

2. Exhibition of skills required for conducting the documented laboratory procedure as well as developed skills for the planning new experiments, data analysis and presentation of quantitative and qualitative data or information, ideas, concepts etc.
3. Acquisition of competence in the use of routine materials, techniques and practices of chemistry
4. Development of competence in intellectual, practical, IT skills and Communication skills necessary for employment as professional chemist. Development of responsibilities of the uses of chemistry in everyday life

6. Objectives of the Programme:

The objectives of this course are the following:

- (a) To impart knowledge in advanced concepts and applications in various fields of Chemistry.
- (b) To provide wide choice of elective subjects with updated and new areas in various branches of Chemistry to meet the needs of all students.
- (c) To teach the students about good laboratory practices, safety of oneself and others in the laboratory.
- (d) To acquire the different practical skills, hands on training on basic equipments, and data analysis for research and better job prospective.
- (e) To train the students in accepting the challenges in Chemistry and to become a responsible citizen in the society.

7. Eligibility for Admission to this course

A candidate who has passed the-

- Bachelor of Science from any recognized university with Chemistry as the Principle subject (Major) or Chemistry (Honors).
- Bachelor of Science from any recognized university with Chemistry as one of the subjects.
- The candidate who has secured aggregate of 50% marks (45 % marks in case of SC/ST) in the graduate course as well as in the Chemistry subject shall be eligible for admission to the First Year M.Sc. degree course.

8. Intake capacity

The intake capacity of the course will be-

M. Sc. I (Analytical/ Organic Chemistry) - 80

9. Medium of Instruction : English

Program outcomes (POs) for M.Sc. (Analytical/Organic Chemistry)

On successful completion of this programme, student is expected to learn the following:

PO-1 Basic and In-depth Knowledge

Ability to deliver and describe basic and in-depth knowledge gained during the programme. Achieve theoretical and practical understanding from the specific programme.

PO-2 Critical thinking and problem solving abilities

Capable of identifying and analyzing the problem critically and applying acquired knowledge and analytical skills to solve the problems.

PO-3 Creativity and Innovation:

Capable to identify, formulate, investigate and analyze the scientific problems and innovatively design and create products and solutions to real life problems.

PO-4 Research aptitude and scientific approach

Ability to develop a research aptitude and apply knowledge and skills to find the solution for the burning research problems in the concerned and associated fields.

PO-5 Skill enhancement

Capable of writing and expressing innovative ideas and problems scientifically and communicating effectively with others using appropriate media- such as oral presentation, interactive skills and others. Able to write a research paper or project by giving special attention on ethics, scientific conduct and creating awareness about intellectual property rights and issues of plagiarism.

Ability to learn lifelong learning skills which are important to provide better opportunities and improve quality of life.

PO-6 Multidisciplinary knowledge and Entrepreneurship

Using conceptual fundamental disciplinary knowledge in-depth, as well as interdisciplinary and multidisciplinary approach across the fields. Learning advanced techniques and apply them for betterment of mankind. Capable to establish independent start up or business.

PO-7 Leadership and Teamwork abilities

Ability to learn and work independently as well as in a group and capable of leading a team for group project.

PO-8 Environmental sustainability

Learn important aspects associated with environmental issues and impact on Human health. Ability to develop eco-friendly and green technologies for sustainable development.

PO-9 Job opportunities

Competent to pursue research or pursue a career in the subject. Explore job related to teaching, research and in industries.

10. Program Specific Outcomes (PSOs) for M.Sc. Analytical Chemistry

On successful completion of this programme, the student is expected to learn the following:

PSO-1 Basic and In-depth knowledge

Acquire a thorough knowledge about fundamental, theoretical concepts and experimental aspects of different branches of chemistry.

PSO-2 Skill enhancement.

Develop the skills for using the basic and advanced techniques, modern instrumentation for chemical analysis, separation and synthesis.

PSO-3 Critical Thinking

Develop the attitude of critical thinking and scientific approach for problem solving and providing appropriate solutions using chemistry.

PSO-4 Research aptitude

Develop the capability to search, acquire and apply recent developments in research field of chemical sciences to the current problems faced by the society and to the nation development.

PSO-5 Environmental Sustainability

Develop an overview of the role of chemical sciences and chemical industry for environmentally sustainable development.

PSO-6 Creativity and Innovation

Develop the skill to adopt the learned principles in various fields of chemistry

and multi-disciplinary knowledge in various applications and innovations for the betterment of mankind.

PSO-7 Professional Competency

Learn communication skills through oral presentations, seminars, group discussions and compiling the information data in the form of research or project reports.

PSO-8 Moral and Ethical Values

Develop awareness in academic and research, professional ethics, scientific misconduct, misrepresentation and manipulation of data.

PSO-9 Job Opportunities

Build the capacity to compete for the available job opportunities or work independently or in collaboration in research, industries and other organizations.

11. Program Specific Outcomes (PSOs) For M. Sc. Organic Chemistry

On successful completion of this program, the student is expected to learn the following:

PSO-1 Knowledge capability

Gains in depth knowledge about the fundamental concepts of organic chemistry with analytical point of view.

PSO-2 Critical thinking

Think critically, analyze the problem systemically and provide the appropriate solution.

PSO-3 Creativity and innovation

Apply out of box knowledge and develop innovative approach by using modern instrumentation techniques for chemical analysis and synthesis.

PSO-4 Research Aptitude

Develop the research aptitude and scientific approach that gives job opportunities, in chemical, polymer, material, food products, pharmaceutical, health and life sciences related industries.

PSO-5 Social Responsibility

Apply analytical and recent instrumental techniques to develop new products with social concern for welfare of mankind.

PSO-6 Skill Development

Develop communication skills, life long learning skills which are important to provide better opportunities and improve quality of life.

PSO-7 Environmental sustainability

Develop an overview of the role of chemical sciences and chemical industries and its impact on environmentally sustainable development.

PSO-8 Moral and Ethical Values

Adopt moral and ethical responsibilities in research and develop awareness in copying of data, issues of plagiarism. Develop scientific conduct and creating awareness about intellectual property rights.

12. Rules and regulation

1. The M. Sc. programme is for 2 academic years and 4 semesters. The minimum total number of credits requirements for each programme is 88 credits.
2. A two-year PG programme with one exit option for those who have completed the three-year Bachelor's Degree Programme.
3. The students, after successful completion of 44 credits in the first year of a two-year PG programme may opt for the exit. Such students will be awarded the PG Diploma in Chemistry. They need to re-enter the programme from where they left off, in the college or may admit to any other HEIs within three years of exit and complete the degree programme within a maximum period of 04 years from the date of admission in the first year of the PG Programme.
4. The M.Sc. degree will be awarded to the students who complete a total of 88 credits in a minimum of two years by completing an average of 22 credits per semester.
5. The curricular design of the first year of the two-year PG Programme aligned with that of the fourth year of the four-year Honors Degree Programmes. Research Methodology (aligned with the seventh semester of the fourth year of Honors and Honors with Research Degree of four-year UG Programmes) and OJT/Internship/Field project of 4 credits (aligned with the eighth semester of the fourth year of Honors Degree of four-year UG Programmes) are introduced in the first semester and the second semester, respectively of the first year of Two-Year PG Programmes.
6. Second Year PG Programmes will include Research Projects of 10 Credits divided uniformly (4 plus 6) over the third and fourth semesters.
7. Each theory credit is equivalent to 15 clock hours of teaching and each practical, project, and internship credit is equivalent to 30 clock hours of laboratory work in a semester.

8. Semester Grade Points Average (SGPA) will be calculated based on 22 credits and Final Cumulative Grade Point Average (CGPA) will be calculated based on 88 credits from all four semesters.

9. The duration of each theory semester is 15-18 weeks in which teaching and continuous internal assessment are mandatory.

10. The duration of each practical semester is 15 to 18 weeks in which at least a 14-week laboratory session and one week of internal evaluation including viva and journal certification are mandatory.

11. All the students admitted to the Post graduation programme in the college should register themselves on the Academic Bank of Credits (ABC) portal and create their ABC ID. Students also need to share their ABC ID to the college examination cell at the beginning of the academic year.

13. Credit Distribution of M.Sc. (Analytical/Organic Chemistry) program:

The overall structure and credit distribution of the course to be implemented from the academic year 2023-2024 onwards is as follows.

Level	Sem.	Major Subject				RM	OJT / FP	RP	Cu. Cr.	Degree
		DSC		DSE						
		T	P	T	P	T				
6	I (VII of B.Sc. Hons.)	2 Courses × 4 Credits	2 Courses × 2 Credits	1 Course × 4 Credits	1 Course × 2 Credits	4	-	-	22	44 PG Diploma (After 3 years degree)
	II (VIII of B.Sc. Hons.)	2 Courses × 4 Credits	2 Courses × 2 Credits	1 Course × 4 Credits	1 Course × 2 Credits	-	4	-	22	
		Exit Option : PG Diploma (44 Credits)								
6.5	III	2 Courses × 4 credit	2 Courses × 2 credits	1 Course × 4 credits	1 Course × 2 credits	-	-	4	22	88 PG Degree (After 3 years UG OR PG degree after 4 year UG)
	IV	3 Courses x 4 credit		1 Course ×4 credits	-	-	-	6	22	
		PG degree with 88 credits								

Students completed B.Sc. Honors / Honors with research degree will take admission to M.Sc. II directly

Distribution of credits:

Year	Level	Semester	DSC		DSE		OJT/FP	RM	RP	Total Credits
			T	P	T	P				
I	6.0	Sem I	08	04	04	02	-	04	00	22
		Sem II	08	04	04	02	04	-	00	22
II	6.5	Sem III	08	04	04	02	-	-	04	22
		Sem IV	12	00	04	00	-	-	06	22
			36	12	16	06	04	04	10	88

14. Course Structure of M. Sc (Analytical/Organic Chemistry):

Semester – I

Title of the Course: M. Sc. I (Analytical / Organic Chemistry)

Year	Sem.	Course Code	Course Name	Credits	No. of Lecture Hrs.	Total Credits		
I	I	DSCCH-101	Inorganic Chemistry-I	4	60	22		
		DSCCH-102	Organic Chemistry-I	4	60			
		DSCCH-103	Inorganic Chemistry Practical-I	2	60			
		DSCCH-104	Organic Chemistry Practical-I	2	60			
		Elective : Select any One						
		DSECH-105A	Physical Chemistry-I	4	60			
		DSECH-105B	Fundamentals of Analytical Chemistry					
		DSECH-105C	Green Chemistry and Green Energy					
		DSECH-106	Physical Chemistry Practical-I	2	60			
		RMCH-107	Research Methodology	4	60			
	II	DSCCH-201	Inorganic Chemistry-II	4	60	22		
		DSCCH-202	Organic Chemistry-II	4	60			
		DSCCH-203	Inorganic Chemistry Practical-II	2	60			
		DSCCH-204	Organic Chemistry Practical-II	2	60			
		Elective : Select any One						
		DSECH-205A	Physical Chemistry-II	4	60			
		DSECH-205B	Applied Analytical Chemistry					
DSECH-205C		Introduction to Nanomaterials and Nanotechnology						
DSECH-206	Physical Chemistry Practical-II	2	60					
OJT/FP/INS-207	OJT/Field Project/Internship	4	120					

M. Sc II Analytical Chemistry

Year	Sem.	Course Code	Course Name	Credits	No. of Lecture Hrs.	Total Credits		
II	III	DSCAC-301	Electronics and Material Analysis	4	60	22		
		DSCAC-302	Fundamentals of Spectroscopy	4	60			
		DSCAC-303	Analytical Chemistry Practical- I	2	60			
		DSCAC-304	Analytical Chemistry Practical- II	2	60			
		Elective: Select any One						
		DSEAC-305A	Analysis of Pharmaceuticals	4	60			
		DSEAC-305B	Analysis of Cosmetics and Forensic Samples					
		DSEAC-305C	Analytical Chemistry of agriculture, polymer and detergents					
	DSEAC-306	Analytical Chemistry Practical- III	2	60				
	RPAC-307	Research Project	4	120				
	IV	DSCAC-401	Spectroscopic Methods of Analysis	4	60	22		
		DSCAC-402	Modern Separation Methods	4	60			
		DSCAC-403	Thermal, Radio and Electroanalytical Methods	4	60			
Elective: Select any One								
DSEAC-404A		Environmental Science and Waste Management	4	60				
DSEAC-404B		Basics of Clinical Biochemistry						
DSEAC-404C		Computer Interface with Chemistry						
RPAC-405	Research Project	6	180					

M. Sc II Organic Chemistry

Year	Sem.	Course Code	Course Name	Credits	No. of Lecture Hrs.	Total Credits		
II	III	DSCOC-301	Advanced Organic Reaction Mechanism	4	60	22		
		DSCOC-302	Spectroscopic Methods in Structure Determination	4	60			
		DSCOC-303	Organic Chemistry Practical-III	2	60			
		DSCOC-304	Organic Chemistry Practical-IV	2	60			
		Elective: Select any One						
		DSEOC-305A	Advanced Stereochemistry	4	60			
		DSEOC-305B	Medicinal Chemistry					
		DSEOC-305C	Applied Organic Chemistry					
		DSEOC-306	Organic Chemistry Practical-V	2	60			
		RPOC-307	Research Project	4	120			
	IV	DSCOC-401	Synthetic Organic Chemistry	4	60	22		
		DSCOC-402	Chemistry of Natural Products	4	60			
		DSCOC-403	Heterocyclic Chemistry	4	60			
		Elective: Select any One						
DSEOC-404A		Bio-organic Chemistry	4	60				
DSEOC-404B		Green Chemistry						
DSEOC-404C		Computer Interface with Chemistry						
RPOC-405	Research Project	6	180					

Structure for M.Sc. (Analytical/Organic Chemistry)**Semester – I**

Course Code	Type of Course	Course Name	Hrs/ Week	Credits	Maximum Marks		Exam hrs	Total
					Internal Assessment	University Examination		
DSCCH-101	Theory	Inorganic Chemistry-I	4	04	40	60	2.5	100
DSCCH-102	Theory	Organic Chemistry-I	4	04	40	60	2.5	100
DSCCH-103	Practical	Inorganic Chemistry Practical- I	4	02	20	30	3	50
DSCCH-104	Practical	Organic Chemistry Practical- I	4	02	20	30	3	50
DSECH-105A DSECH-105B DSFCH-105C	Theory	1.Physical Chemistry-I 2.Fundamentals of Analytical Chemistry 3.Green Chemistry and Green Energy	4	04	40	60	2.5	100
DSECH-106	Practical	Physical Chemistry Practical- I	4	02	20	30	3	50
RMCH-107	Theory	Research Methodology	4	04	40	60	2.5	100
	Total			22	190	360		550

Semester II

Course Code	Type of Course	Course Name	Hrs./ Week	Credits	Maximum Marks		Exam hrs.	Total
					Internal Assessment	University Examination		
DSCCH-201	Theory	Inorganic Chemistry-II	4	04	40	60	2.5	100
DSCCH-202	Theory	Organic Chemistry-II	4	04	40	60	2.5	100
DSCCH-203	Practical	Inorganic Chemistry Practical- II	4	02	20	30	3	50
DSCCH-204	Practical	Organic Chemistry Practical- II	4	02	20	30	3	50
DSECH-205A DSECH-205B DSFCH-205C	Theory	1.Physical Chemistry-II 2.Applied Analytical Chemistry 3. Introduction to Nanomaterials and Nanotechnology	4	04	40	60	2.5	100
DSECH-206	Practical	Physical Chemistry Practical- II	4	02	20	30	3	50
OJT/FP/INS-207		OJT/Field Project/Internship	4	04	40	60	---	100
Semester Total				22	190	360		550

M. Sc II Analytical Chemistry**Semester III**

Course Code	Type of Course	Course Name	Hrs/ Week	Credits	Maximum Marks		Exam hrs	Total
					Internal Assessment	University Examination		
DSCAC-301	Theory	Electronics and Material Analysis	4	04	40	60	2.5	100
DSCAC-302	Theory	Fundamentals of Spectroscopy	4	04	40	60	2.5	100
DSCAC-303	Practical	Analytical Chemistry Practical- I	4	02	20	30	3	50
DSCAC-304	Practical	Analytical Chemistry Practical- II	4	02	20	30	3	50
DSEAC-305A	Theory	1.Analysis of Pharmaceuticals	4	04	40	60	2.5	100

DSEAC-305B		2. Analysis of Cosmetics and Forensic Samples						
DSEAC-305C		3. Analytical Chemistry of agriculture, polymer and detergents						
DSEAC-306	Practical I	Analytical Chemistry Practical- III	4	02	20	30	3	50
RPAC-307	Project	Research Project	--	04	40	60	--	100
Semester Total				22	190	360		550

M. Sc. II Analytical Chemistry

Semester IV

Course Code	Type of Course	Course Name	Hrs./ Week	Credits	Maximum Marks		Exam Hrs.	Total
					Internal Assessment	University Examination		
DSCAC-401	Theory	Spectroscopic Methods of Analysis	4	04	40	60	2.5	100
DSCAC-402	Theory	Modern Separation Methods	4	04	40	60	2.5	100
DSCAC-403	Theory	Thermal, Radio and Electroanalytical Methods	4	04	40	60	2.5	100
DSEAC-404A	Theory	1. Environmental Science and Waste Management	4	04	40	60	2.5	100
DSEAC-404B		2. Basics of Clinical Biochemistry						
DSEAC-404C		3. Computer Interface with Chemistry						
RPAC-405	Project	Research Project	--	06	60	90	---	150
Total				22	220	330		550

M. Sc. II Organic Chemistry

Semester III

Course Code	Type of Course	Course Name	Hrs./ Week	Credits	Maximum Marks		Exam Hrs.	Total
					Internal Assessment	University Examination		
DSCOC-301	Theory	Advanced Organic Reaction Mechanism	4	04	40	60	2.5	100
DSCOC-302	Theory	Spectroscopic Methods in Structure Determination	4	04	40	60	2.5	100
DSCOC-303	Practical	Organic Chemistry Practical-III	4	02	20	30	3	50
DSCOC-304	Practical	Organic Chemistry Practical-IV	4	02	20	30	3	50
DSEOC-305A DSEOC-305B DSEOC-305C	Theory	1. Advanced Stereochemistry 2. Medicinal Chemistry 3. Applied Organic Chemistry	4	04	40	60	2.5	100
DSEOC-306	Practical	Organic Chemistry Practical-V	4	02	20	30	3	50
RPAC-307	Project	Research Project	-	04	40	60	---	100
Semester Total				22	190	360		550

M. Sc. II Organic Chemistry

Semester IV

Course Code	Type of Course	Course Name	Hrs./ Week	Credits	Maximum Marks		Exam Hrs.	Total
					Internal Assessment	University Examination		
DSCOC-401	Theory	Synthetic Organic Chemistry	4	04	40	60	2.5	100
DSCOC-402	Theory	Chemistry of Natural Products	4	04	40	60	2.5	100
DSCOC-403	Theory	Heterocyclic Chemistry	4	04	40	60	2.5	100
DSEOC-404A DSEOC-404B DSEOC-404C	Theory	1. Bio-organic Chemistry 2. Green Chemistry 3. Computer Interface with Chemistry	4	04	40	60	2.5	100
RPOC-405	Project	Research Project	-	06	60	90	---	150
	Total			22	220	330		550

i) Each theory paper shall be covered in 4 clock hours lecture per week. Each practical course shall be covered in one practical turn of four clock hours per week.

ii) Students will have to complete an on job training or internship program or field project / community engagement program of 4 credits (120 clock hours duration) during semester II in the subject related industry / laboratory / research institute or any other academic institute. The 120 clock hours should be completed as 15 days x 8 hrs daily or 30 days x 4 hrs daily. He / She may start his/her on job training or internship program or field project / community engagement program immediately after completion of the theory examination of first semester. He / She has to submit a brief report and certificate of on job training / internship program / field project / community engagement program to the department before commencement of practical examination. Further, he/she has to give the presentation of his/her work at the time of University practical examination before external and internal examiners.

15. Scheme of Examination

a. The assessment of students shall be based on -

(a) University Examinations (UE)

(b) Internal Assessment (IA)

Weightage for Assessments (in Percentage)

Course Type	Formative / Internal Assessment	Summative/University Assessment
Theory	40 %	60 %
Practical	40 %	60 %
Projects	40 %	60 %

- For the theory course of 4 credits, there will be an Internal Assessment of 40 marks and the University Examination of 60 marks of 2.5 hours duration at the end of each semester.
- The University practical examination of each semester will be conducted at the end of the semester and duration will be 3 hours.
- The internal assessment of theory course may be in the form of – Home Assignment / Attendance/ Oral/ Tutorial/ Unit Test / Presentation / Seminar / Online mid-semester examination / in MCQ pattern etc.
- Internal assessment for the practical course will be based on the internal practical examination and the performance of the students during regular practicals./ practical attendance.
- The distribution of marks for theory internal assessment will be as –

Mid semester Examination	20 Marks
Attendance / Home Assignment / Oral /Tutorial / Unit Test / Presentation / Seminar	20 Marks

- The distribution of marks for practical internal assessment will be as –

Internal practical examination	15 Marks
Performance during regular practicals./ practical attendance	05 Marks

- The final result of the students in each subject will be based on final GPA obtained by the students for the internal assessment and University Examination.

b. Assessment of Research projects : The assessment for the said courses should be carried out as follows-

i) Internal Assessment by Research Guide:

The entire project will be internally assessed by research guide for 40 % marks where the candidate works for research project.. Criteria used for the assessment will be as follow:

Sr.No.	Criteria
1	Understanding the basic concept of dissertation
2	Fulfillment of Aims and objectives
3	Results, discussion and conclusion
4	Regularity and punctuality
5	Literature Review
6	Potential Applications of the work / Social relevance

ii) University Evaluation:

University evaluation will be carried out for 60 % Marks. This will be conducted as open defense presentation. In case of national emergencies, online presentation is allowed. For the purpose of the evaluation the University will appoint two examiners. One examiner will be external having adequate research experience and minimum qualification as Ph.D. Another examiner will be appointed from the institute where, the candidate has registered for his/her postgraduate degree.

Examiners as appointed above will evaluate the dissertation of the candidate for 60 % marks. Following criteria should be used for evaluation purpose by examiners.

Sr.No.	Criteria
1	Understanding the basic concept of dissertation
2	Fulfillment of Aims and objectives
3	Results, discussion and conclusion
4	Regularity and punctuality
5	Literature Review
6.	Potential Applications of the work/Social relevance

• **Rules regarding ATKT to second year M.Sc. Chemistry course:**

A student will be allowed to keep terms at the second year of the M.Sc. course if his / her terms for the first year have been granted as per university rules.

16. Standard of passing :

For all courses, both University Examinations (UE) and Internal Assessments (IA) constitute separate heads of passing. In order to pass in such courses and to earn the assigned credits, the learner must obtain a minimum grade point of 5.0 (40% marks) at UE and also a minimum grade point of 5.0 (40% marks) at IA. If a student fails in IA, the learner passes in the course provided he/she obtains a minimum of 25 % in IA and GPA for the course is at least 6.0 (50% in aggregate). The GPA for a course will be calculated only if the learner passes at the UE.

A student who fails at UE in a course has to reappear only at UE as a backlog candidate and clear the head of passing. Similarly, a student who fails in a course at IA has to reappear only at IA as a backlog candidate and clear the head of passing.

The 10 point scale grades and grade points according to the following table:

Range of Marks(out of 100)	Grade	Grade point
$80 \leq \text{Marks} \leq 100$	O	10
$70 \leq \text{Marks} < 80$	A ⁺	9
$60 \leq \text{Marks} < 70$	A	8
$55 \leq \text{Marks} < 60$	B ⁺	7
$50 \leq \text{Marks} < 55$	B	6
$40 \leq \text{Marks} < 50$	C	5
Marks < 40	D	0

The performances at UE and IA will be combined to obtain the grade point average (GPA) for the course. The Weights for performances at UE and IA shall respectively be 60 % and 40 %. GPA is calculated by adding the UE marks out of 60 and IA marks will be out of 40. The total marks out of 100 are converted to grade point, which will be the GPA.

a. Formula to calculate Grade points (GP):

Suppose that, "Max" is the maximum marks assigned for an examination or

evaluation based on which GP will be computed. In order to determine the GP, set $x = \text{Max}/10$ (since we have adapted 10 point system). Then GP is calculated by the formula as shown as below.

Range of Marks at the evaluation	Formula for the grade point
$8x \leq \text{Marks} \leq 10x$	10
$5.5x \leq \text{Marks} < 8x$	Truncate (Marks/x)+2
$4x \leq \text{Marks} < 5.5x$	Truncate (Marks/x)+1

Two kinds of performance indicators, namely the Semester Grade point average (SGPA) and the Cumulative Grade Point Average (CGPA) shall be computed at the end of each term. The SGPA measures the cumulative performance of a learner in all courses in a particular semester, while the CGPA measures the cumulative performance in all courses since his/her enrolment. The CGPA of learner when he/she completes the programme is the final result of the learner.

The SGPA is calculated by the formula $SGPA = \frac{\sum C_k \times GP_k}{\sum C_k}$, where C_k is the credit value

Assigned to a course and GP_k is the GPA obtained by the learner in the course. In the above, the sum is taken over all the courses that the learner has undertaken for the study during the semester, including those in which he/she might have failed or those for which he/she remained absent. The SGPA shall be calculated upto two decimal place accuracy.

The CGPA is calculated by the formula $CGPA = \frac{\sum C_k \times GP_k}{\sum C_k}$, where C_k is the credit value

Assigned to a course and GP_k is the GPA obtained by the learner in the course. In the above, the sum is taken over all the courses that the learner has undertaken for the study from the time of his/her enrolment and also during the semester for which CGPA is calculated, including those in which he/she might have failed or those for which he/she remained absent. The CGPA shall be calculated upto two decimal place accuracy.

The formula to compute equivalent percentage marks for specified CGPA:

%Marks (CGPA) =	10xCGPA-10	If $5.00 \leq \text{CGPA} \leq 6.00$
	5xCGPA+20	If $6.00 \leq \text{CGPA} \leq 8.00$
	10xCGPA -20	If $8.00 \leq \text{CGPA} \leq 9.00$
	20xCGPA -110	If $9.00 \leq \text{CGPA} \leq 9.50$
	40xCGPA-300	If $9.50 \leq \text{CGPA} \leq 10.00$

b. Awards of Honours :

A student who has completed the minimum credits specified for the program shall be declared to have passed in the program. The final result will be in terms of letter grade only and is based on the CGPA of all courses studied and passed. The criteria for the award of honors are given below.

Range of CGPA	Final Grade	Performance Descriptor	Equivalent Range of Marks (%)
$9.50 \leq \text{CGPA} \leq 10.00$	O	Outstanding	$80 \leq \text{Marks} \leq 100$
$9.00 \leq \text{CGPA} \leq 9.49$	A+	Excellent	$70 \leq \text{Marks} < 80$
$8.00 \leq \text{CGPA} \leq 8.99$	A	Very Good	$60 \leq \text{Marks} < 70$
$7.00 \leq \text{CGPA} \leq 7.99$	B+	Good	$55 \leq \text{Marks} < 60$
$6.00 \leq \text{CGPA} \leq 6.99$	B	Average	$50 \leq \text{Marks} < 55$
$5.00 \leq \text{CGPA} \leq 5.99$	C	Satisfactory	$40 \leq \text{Marks} < 50$
CGPA below 5.00	F	Fail	Marks Below 40

c. Format of the transcript:

Transcript will be provided to the candidate as per Bharati Vidyapeeth (Deemed to be University), Pune rules and respective amendments as implemented by the university.

d. Grade/class improvement:

The rules regarding the improvement of grade/class of M. Sc. Course will be as per notification of Bharati Vidyapeeth (Deemed to be University), Pune.

e. Verification and revaluation:

There is provision for verification and revaluation of the result. A student can apply for the verification and revaluation of the result within the two weeks from the declaration of the results with the prescribed fee. The verification and revaluation shall be done as per the existing rules of the University.

Pattern of Question Paper

For theory courses, end semester question papers will be set by the University. Assessment for theory papers will be done as per the rules laid down by the University. Questions will be designed to test the conceptual knowledge and understanding of the basic and advanced concepts of the subject. There will be **two sections** for each paper. Each section will be of **30 marks** and the pattern of question paper shall be:

M.Sc. (Analytical Chemistry/ Organic Chemistry)

NEP-2023

Subject:

Day:

Time: 3Hrs.

Date:

Max. Marks: 60

Instructions: 1) All questions are compulsory.

2) Answers to both the sections should be written in a SEPARATE answer book.

SECTION-I

Q. 1. Attempt / Answer ANY THREE of the following :(15)

- a)
- b)
- c)
- d)
- e)

Q. 2. Attempt / Answer ANY THREE of the following :(15)

- a)
- b)
- c)
- d)
- e)

SECTION-II

Q. 3. Attempt / Answer **ANY THREE** of the following:(15)

- a)
- b)
- c)
- d)
- e)

Q. 4. Attempt / Answer **ANY THREE** of the following:(15)

- a)
 - b)
 - c)
 - d)
 - e)
-