

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil College Vashi, Navi Mumbai
(Autonomous)

Name of the Faculty: Science and Technology

Name of the Program: Masters in Science

Program Outcomes (POs)

PO-1	Disciplinary Knowledge and Skills: Acquire the comprehensive and in-depth knowledge of various subjects in sciences such as Physics, Chemistry, Mathematics, Microbiology, Bio-analytical Science, Computer Science, Data Science, Information Technology and disciplinary skills and ability to apply these skills in the field of science, technology and its allied branches.
PO-2	Communication and Presentation Skills: Develop various communication skills including presentation to express ideas evidently to achieve common goals of the organization.
PO-3	Creativity and Critical Judgement: Facilitate solutions to current issues based on investigations, evaluation and justification using evidence based approach.
PO-4	Analytical Reasoning and Problem Solving: Build critical and analytical attitude in handling the problems and situations.
PO-5	Sense of Inquiry: Curiously raise relevant questions based on highly developed ideas, scientific theories and its applications including research.
PO-6	Use of Digital Technologies: Use various digital technologies to explore information/data for business, scientific research and related purposes.
PO-7	Research Skills: Construct, collect, investigates, evaluate and interpret information/data relevant to science and technology to adapt, evolve and shape the future.
PO-8	Application of Knowledge: Develop scientific outlook to create consciousness against the social myths and blind faith.
PO-9	Moral and Ethical Reasoning: Imbibe ethical, moral and social values to develop virtues such as justice, generosity and charity as beneficial to individuals and society at large.
PO-10	Leadership and Teamwork: Work cooperatively and lead proactively to achieve the goals of the organization by implementing the plans and projects in various field-based situations related to science, technology and society at large.
PO-11	Environment and Sustainability: Create social awareness about environment and develop sustainability for betterment of future.
PO-12	Lifelong Learning: Realize that pursuit of knowledge is a lifelong activity and in combination with determined efforts, positive attitude and other qualities to lead a successful life.



Bhattacharya
Program
Coordinator

Anand
BOS
Chairman

Rayat
Principal
I/C PRINCIPAL
KARMAVEER BHURAO PATIL COLLEGE
VASHI, NAVI MUMBAI 400 703.

Program Specific Outcomes (PSO)

PSO-1	Scientific Problem solving skills: Deep knowledge of the topic which can develop the problem solving skills using chemical principles.
PSO-2	Analytical skills: Develop analytical skills such as synthesizing, separating, characterizing chemical compounds and chemical reaction with the help of sophisticated instruments..
PSO-3	Research skills: Develop research skills through dissertation/Project work in different fields of chemistry such as organic, nanoscience, analytical, physical etc.

Bhoyade
Program
Coordinator


R. Mohite
BOS
Chairman

Wajah
Principal
KARMAVEER BHURAO PATIL COLLEGE
VASHI, NAVI MUMBAI 400 703.

Title of Specific Program:

M.Sc. Organic Chemistry

Course Code	Title of Course	Course Outcome
		After successful completion of each course in Chemistry a learner should be able to;
Semester-I		
PGCH101	Physical Chemistry	<ol style="list-style-type: none">1. To discuss concept of quantization, quantum numbers and degeneracy of energy level, kinetics and mechanism of chain reaction (2).2. To explain concept of classical thermodynamics and quantum chemistry (2).3. To deduce Maxwell equations and Schrodinger wave equation (4).4. To summarize basics of electrochemistry (2).
PGCH102	Inorganic Chemistry	<ol style="list-style-type: none">1. To derive wave functions, construct molecular orbital diagram, and Symmetry adapted linear combinations (SALC) for polyatomic species (5,6)2. To analyse VBT, molecular symmetry and applications of group theory (4,5)3. To discuss the various aspects of materials chemistry, nanomaterials and co-ordination chemistry (2)4. To interpret the electronic spectra of co-ordination compounds (3)
PGCH103	Organic Chemistry	<ol style="list-style-type: none">1. To apply the thermodynamic and kinetic requirements of a reaction (3).2. To explain nucleophilic substitution reactions and aromaticity (2)3. To determine stereochemistry of molecules with two or more chiral centres (2)4. To predict the reaction mechanism by using various oxidizing and reducing reagents (4)
PGCH104	Analytical Chemistry	<ol style="list-style-type: none">1. To apply the various spectroscopic techniques for qualitative and quantitative analysis (3)2. To understand various terms used in analytical chemistry and hyphenated techniques (2)3. To determine the concentration of unknown sample by spectroscopic methods. (2)4. To interpret the thermo-gravimetric curves of various samples (4)
PGCHSEC 105A	GLP safety Measurement	<ol style="list-style-type: none">1. To study Concepts of Philosophy of Quality assurance and regulatory affairs. (2)2. To understand the mechanism of Good manufacturing practices and safety operations in Laboratory. (5)3. To understand the mechanism of Quality control Laboratory. (4)4. To understand the concepts of Quality Management System and Regulatory requirements and approval procedures for New Drugs. (2)
PGCHSEC1 05B	QA and QC	<ol style="list-style-type: none">1. To study Concepts of Philosophy of Quality assurance and regulatory affairs. (3)2. To understand the mechanism of Good manufacturing practices and safety operations in Laboratory. (3)3. To understand the mechanism of Quality control Laboratory. (2)4. To understand the concepts of Quality Management System and Regulatory requirements and approval procedures for New Drugs. (2)



PGCHP101	Physical Chemistry Practical	<ol style="list-style-type: none"> 1.To understand how to determine the heat of solution at different temperature, ionic strength of various inorganic salts (2) 2. To evaluate kinetics of the reactions. (5) 3. To understand various methods of graph plotting. 4. To understands various instrumental techniques.
PGCHP102	Inorganic Chemistry Practical	<ol style="list-style-type: none"> 1. To synthesize and characterize various inorganic complexes (5). 2. To determine the electrolytic nature and equilibrium constants of inorganic compounds. (2)
PGCHP103	Organic Chemistry Practical	<ol style="list-style-type: none"> 1. To plan the synthesis of organic compounds. (4,6) 2. To know safety aspects including MSDS. (1) 3.To calculate stoichiometric requirement (5)
PGCHP104	Analytical Chemistry Practical	<ol style="list-style-type: none"> 1. To estimate the amount of Cr (III), Fe(II), alloy sample by complexometric titration. (5) 2.To determine the breakthrough capacity of a cation exchange resin (2)
Semester-II		
PGCH201	Physical Chemistry	<ol style="list-style-type: none"> 1.To describe the fugacity of real gases using graphical method, equation of state, and various mixing properties (2) 2. To deduce various equations in modern thermodynamics, surface chemistry and quantum chemistry. (4) 3. To construct probability density curves, radial and angular plots for different orbitals. (4,6) 4.To understand chemical kinetics, molecular reaction dynamics, solid state chemistry and phase equilibria (2)
PGCH202	Organic Chemistry	<ol style="list-style-type: none"> 1. To understand the basic concept of molecular orbital theory, UV-Visible and IR spectroscopic techniques. (2) 2. To predict the reaction mechanism of various rearrangement reactions (4) 3. To illustrate various alkylating agents using carbanion intermediate (2) 4.To understand and apply various spectroscopic techniques for predicting organic compounds (2,4,5)
PGCH203	Research methodology	<ol style="list-style-type: none"> 1.To understand various terminologies like Journal abbreviations, abstracts, current titles, reviews etc. (2) 2. To deduce information related given subject from digital sources available online. (4) 3. To analyse and present data of studied material using various calculative methods, tools and software. (4) 4. To publish scientific work done by using ethics and avoiding plagiarism. (6) 5. To demonstrate disposal of waste chemicals, recovery, recycling and reuse of laboratory chemicals. (3)
PGCHDSE 204B	Industrial Inorganic Chemistry	<ol style="list-style-type: none"> 1.To explain the methods of determining rate of reaction and inorganic reaction mechanism (2) 2.To apply Eighteen and sixteen electron rules for various organometallic compounds (3,5) 3.To discuss the environmental concepts of heavy metals (2) 4.To understand various concepts in bioinorganic chemistry (2)
PGCHSEC2 05A :	QA and QC	<ol style="list-style-type: none"> 1. To study Concepts of Philosophy of Quality assurance and regulatory affairs. (3) 2. To understand the mechanism of Good manufacturing practices and safety operations in Laboratory. (2) 3. To understand the mechanism of Quality control Laboratory. (2)



		4.To understand the concepts of Quality Management System and Regulatory requirements and approval procedures for New Drugs(3)
PGCHSEC2 05B:	Introduction to Phytochemistry	1.To account for exploration of biologically active/inactive proto types Newer and better semi-synthetic or synthetic drugs. (2) 2. To understand International Scenario of herbal drug Industry. (2) 3. To understand medicinal uses and health benefits of some Nutraceuticals/ Functional foods. (2) 4.To predict General method of preparation and evaluation of Herbal Cosmetics. (3)
PGCHP201	Physical Chemistry Practical	1. To construct polar plots of atomic orbitals, phase diagram. (4,6) 2. To evaluate the transition temperature and rate constant of chemical reactions. (5) 3. To measure physical parameters of chemical reaction using various instrumental techniques. (5)
PGCHP202	Inorganic Chemistry Practical	1.To analyse various ore and alloy for metal contents (4) 2. To estimate amount of metal potentiometrically in given sample. (5)
PGCHP203	Organic Chemistry Practical	1. To separate given binary mixture. (4) 2. To identify separated organic components by microscale technique. (2,5)
PGCHP204	Analytical Chemistry Practical	1.To analyse the fertilizer sample using flame -photometry 2.To determine amount of various metal ions by using different analytical techniques (2)

MSc II Organic Chemistry

Semester-III-Organic Chemistry

Course Code	Title of Course	Course Outcome
PGCHO301	Theoretical Organic Chemistry-I	1. To explain various concepts in photochemistry pericyclic reactions and conformation of cyclohexane. (2) 2. To describe, classify and predict the reaction mechanism using reactive intermediates and from different pericyclic and photochemical reactions. (2, 5) 3. To apply concept of I-strain, Bredt's rule for cyclic compounds (3)
PGCHO302	Synthetic Organic Chemistry-I	1. To explain various name reactions, radical reactions, enamine incorporated reactions, α -C-H functionalized reactions, etc. (2) 2. To predict the desired product using correct reaction mechanism. (5) 3. To construct a suitable organic synthesis using metal/ non-metallic reagents. (6) 4. To apply suitable mechanistic pathway for organic synthesis using ylides. (3)
PGCHO302	Internship	
PGCHODSE EC-I 304A	Medicinal, Biogenesis and Spectroscopy	1. To explain the procedures in drug design, discovery and development. (2) 2. To construct the mechanistic pathways in biogenesis and biosynthesis of natural products. (6) 3. To elucidate the structure of various natural products. (4) 4. To explain the structural features and applications of different natural products. (2)



PGCHODSE EC-II 304B	Natural products and Green Chemistry	<ol style="list-style-type: none"> 1. To describe various components and concepts in PMR as well as CMR spectroscopic techniques. (2) 2. To deduce the structure of organic compounds using given spectral data. (3,5) 3. To describe various green methodologies in organic synthesis. (2)
PGCHOP301	Practical	<ol style="list-style-type: none"> 1. To know the separation technique of a ternary mixture of organic compounds and their identification. (2) 2. To deduce the structural formula of individual compounds after separation of a ternary mixture (S-S-S, S-S-L, S-L-L and L-L-L). (4) 3. To compile the all chemical and physical data of organic compound for identification of structural formula. (6)
PGCHOP302	Practical	<ol style="list-style-type: none"> 1. To plan the single step organic synthesis. (6) 2. To know the various techniques for the purification of organic compounds. (2) 3. To deduce the structural formula by using IR and NMR spectral data. (4)

Semester IV-Organic Chemistry

Course Code	Title of Course	Course Outcome
PGCHO401	Theoretical Organic Chemistry- II	<ol style="list-style-type: none"> 1. To interpret Hammett and Taft equation for understanding reaction mechanism. (4) 2. To study and apply various reagents for asymmetric synthesis. (2,3) 3. To deduce stereochemical outcomes by using axial halo ketone rule, Cotton effect, ORD & CD, etc. (4) 4. To predict the synthetic products by using various supramolecules as a starting material. (4)
PGCHO402	Methods in Organic synthesis- II	<ol style="list-style-type: none"> 1. To construct, design and create different target molecules by using proper precursor. (3,4,6) 2. To understand basic concepts in retrosynthetic analysis and electro-organic chemistry. (2) 3. To explain and predict the correct product in various coupling reactions. (2,5) 4. To deduce the organic synthesis by using transition and rare earth metals. (4)
PGCHO403	Research project	
PGCHODSE 404A	Natural products and heterocyclic chemistry	<ol style="list-style-type: none"> 1. To understand the various parameters Viz. QSAR, Hansch analysis, multiple regression analysis, etc for drug design and development. (2) 2. To classify various drugs as per their therapeutic actions. (4) 3. To distinguish and classify the heterocyclic compounds on the basis of heteroatom present in the ring system. (4) 4. To predict the desired product with correct reaction mechanism in heterocyclic as well as drug chemistry. (5)
PGCHODSE 404B	Regulatory affairs in pharmaceutical Industry	<ol style="list-style-type: none"> 1. To know Drug regulatory affairs. (3) 2. To understand federal food, drugs, and cosmetics. (4) 3. To apply approval process in drug development. (4) 4. To understand preclinical and clinical studies. (5)
PGCHOSEC 405A	Quality Management systems and Audit	<ol style="list-style-type: none"> 1. To understand Quality management system and ISO Standards (2) 2. To apply the knowledge for registration, certification, audit (3) 3. To plan Audit process (6)



PGCHOSEC-405B	Intellectual property rights & cheminformatics)	<ol style="list-style-type: none"> 1. To define the various concepts in IPR, trade secrets, cheminformatics, etc. (1) 2. To apply the computer assisted drug design and development. (3) 3. To investigate the representation of molecules chemical reactions and searching chemical structures. (5) 4. To classify the different international agreements with respect to WTO and Paris convention. (2,5)
PGCHP4P1	Practical	<ol style="list-style-type: none"> 1. To plan the two step organic synthesis. (6) 2. To apply the various techniques Viz. purification, chromatographic separation, etc. (3)
PGCHO4P2	Practical	<ol style="list-style-type: none"> 1. To compile the spectral as well as chemical data for the structural determination. (6) 2. To adapt a professional as well as laboratory skills through project work. (6)

Note: Numbers in bracket () indicates cognitive levels of revised Blooms Taxonomy as follows:

(1): Remembering, (2): Understanding, (3): Applying, (4): Analysing, (5): Evaluating, (6): Creating



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