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X. FACULTY OF SCIENCE

DEPARTMENT OF ANTHROPOLOGY

ABOUT THE DEPARTMENT

The Department was established in 1960. During the last more than five decades, the Department has not only grown in terms of personnel, equipment and laboratories, and library, it has contributed significantly to the furtherance of anthropological teaching and research in the country.

Infrastructure and Laboratory facilities for teaching and research are available in Anthropology, Osteology, Serology and Bio-chemical Anthropology, Paleoanthropology and Prehistoric Archaeology, Socio-Cultural Anthropology, Dermatoglyphics, Forensic Anthropology, Molecular Anthropology, Anatomy and Instrumentation Laboratory. The unique 'S.R.K. Chopra Museum of Man' in the Department has a Gallery of Fossil Apes, Primates and Man which includes life-size models, and an Ethnographic Gallery which includes items of material culture. Fieldwork is organized by the Department where students are given instructions in the field and research methods and based on empirical work they write project reports. The Department was recognized as one of the centers under U.G.C. Programme of Special Assistance and Departmental Research Support in 1988, this programme has been extended up to 2009.

The Department has also been selected for support under UGC assistance for strengthening of the infrastructure of the Humanities & Social Science (ASIHSS) Programme in Anthropology for a period of five years i.e. 1-4-2005 – 31-3-2010. From 2010-2011, the Department has been granted DST – FIST and is also a UGC Centre of Advanced Study (CAS) in Anthropology (2011-2016). The Department has also been awarded CAS-II by the UGC from April 2018 to March 2023.

The faculty of the Department has been handling various research & consultancy projects from prestigious National/State funding agencies. Recently, the faculty has published in the most coveted and high impact factors journals such as *The Lancet* & *Nature*.

FACULTY

Designation	Name	Field of Research Specialization
Professors	A.K. Sinha	Social Anthropology
	Abhik Ghosh	Social Anthropology
Associate Professor	Kewal Krishan	Physical Anthropology
Assistant Professors	Maninder Kaur **(Chairperson)**	Physical Anthropology
	Ramesh Sahani	Physical Anthropology
	Jagmahender Singh	Physical Anthropology
Assistant Professor-cum - Curator	Gayathiri Pathmanathan	Physical Anthropology

COURSES OFFERED (SEMESTER SYSTEM)

Course	Seats	Duration	Eligibility*	Admission Criteria
B.Sc. (Hons.) under the Framework of Honours School System	30+4 NRI +2 Foreign National	3 years	Passed 10+2 class with 50% marks with English, Physics, Chemistry, Mathematics / Biology from recognized Board /CBSE	Based on PU-CET (UG) Academics: 25% PU-CET (UG): 75%
M.Sc. (Hons.) under the Framework of Honours School System	23+3NRI +1 Foreign National	2 years	B.Sc. (Hons. School) Anthropology OR B.A./B.Sc. with 50 % from P.U., or any other recognized University	Based on Merit
Diploma in Forensic Science & Criminology	20+2**+2 NRI +1 Foreign National	1 year	(a) Bachelor's Degree of P.U. subject to having +2 with Science or any equivalent exam OR (b) An equivalent examination of any other University recognized by Syndicate as equivalent to (a) above with 50 % Marks	Based on Merit
Ph.D.	Subject to availability	3-6 Years	See M. Phil/ Ph.D. Prospectus 2021	

* 5% Concession is admissible in eligibility marks to ST/SC/BC/PwD candidates
** For Govt. Sponsored in service Police Personnel

TITLE OF SYLLABI: Detailed course curriculum is available at http://puchd.ac.in/syllabus.php

B.Sc. (Hons.) (Under CBCS system)

SEMESTER-I		SEMESTER-II	
Core Subject (Theory & Practical)		**Core Subject** (Theory & Practical)	
ANTH-C1	Introduction to Biological Anthropology	ANTH-C3	Archaeological Anthropology

ANTH-C2	Introduction to Socio-cultural Anthropology	ANTH-C4	Fundamentals of Human Origins & Evolution
ANTH-AECC1	English	ANTH-AECC2	Environmental Science
SEMESTER-III		**SEMESTER-IV**	
(Theory & Practical)		(Theory & Practical)	
ANTH-C5	Tribes and Peasants in India	ANTH-C8	Theories of Culture and Society
ANTH-C6	Human Ecology: Biological & Cultural Dimensions	ANTH-C9	Human Growth and Development
ANTH-C7	Biological Diversity in Human Populations	ANTH-C10	Research Methods
SEMESTER-I		**SEMESTER-I**	
General Elective : (Theory & Practical)		**General Elective :** (Theory & Practical)	
ANTH-GE1	Introduction to Anthropology	ANTH-GE2	Biological Anthropology
SEMESTER-III		**SEMESTER-IV**	
(Theory & Practical)		(Theory & Practical)	
ANTH-GE3	Fundamental of Palaeo anthropology	ANTH-GE4	Human Growth & Human Genetics
SEMESTER-V		**SEMESTER-VI**	
(Theory & Practical)		(Theory & Practical)	
ANTH-C11	Human Population Genetics	ANTH-C13	Forensic Anthropology
ANTH-C12	Anthropology in Practice	ANTH-C14	Anthropology of India
ANTH- DSE-1	Human Genetics **OR**	ANTH- DSE-3	Paleoanthropology **OR**
ANTH- DSE-2	Physiological Anthropology	ANTH- DSE-4	Tribal Cultures of India
SEC-I	Skill Enhancement Course	SEC-II	Skill Enhancement Course

M.Com (Hons.)

SEMESTER-I		**SEMESTER-I**	
ANTH-C101	Archaeological Anthropology and Palaeoanthropology	ANTH-C201	Anthropological Methods & Techniques
ANTH-C102	Biological Anthropology	ANTH-C202	Museum Studies
ANTH-C103	Social-Cultural Anthropology	ANTH-C203	Human Genetics
DSE-2	Medical Anthropology **OR**	DSE-12	Urban Anthropology **OR**
DSE-15	Human Growth, Development & Nutrition	DSE-7	Prehistoric Archaeology and Palaeoanthropology - Concepts & Palaeolithic cultures
SEC- 1	Field Methodology	SEC-2	Anthropology of SIA
SEMESTER-III Compulsory papers		**SEMESTER-IV** Compulsory papers	
ANTH-C301	Anthropological Theories	ANTH-C401	Demography and Biostatistics
ANTH-C302	Human Ecology and Adaptation	ANTH-C402	Applied Anthropology
ANTH-C303	Anthropology of India	ANTH-C403	Dissertation and viva-voce
DSE-5	Human Biological Variation **OR**	DSE-10	Anthropology of Food **OR**
DSE-11	Symbolic Anthropology	DSE-20	Forensic Anthropology
SEC-3	Documentation of Intangible Cultural Heritage		

Diploma in Forensic Science & Criminology

SEMESTER-I		**SEMESTER-II**	
DFSc 1.1	Fundamentals of Forensic Science -I	DFSc 2.1	Fundamentals of Forensic Science -II
DFSc 1.2	Forensic Anthropology-I	DFSc 2.2	Forensic Anthropology-II
DFSc 1.3	Forensic Physical Sciences-I	DFSc 2.3	Forensic Physical Sciences-II
DFSc 1.4	Criminology & Criminal Law-I	DFSc 2.4	Criminology & Criminal Law-II
DFSc 1.5	Practical in Forensic Science-I	DFSc 2.5	Practical in Forensic Science-II

THRUST AREAS: Palaeoanthropology and Molecular Anthropology; Human Ecology in North-West India; Continuity & Change; and Bio-cultural Correlates of Health and Disease.

PLACEMENTS: Our students have worked for companies like Boeing and Nokia. They have worked as Director of Forensic Science Institute & ICMR and leading Departments in PGIMER & GMCH-32, Chandigarh. Many have gone aboard and are working in premier institutes and universities there. We are attempting to contact other organizations where high level placements may be provided in the future. We are attempting to get our students placed through individual's efforts and through the University Placement Cell. During the last one year, our students received employment as Assistant Professors in the Universities and Institutions; Research Officer in Tribal Development (H.P.), Assistant Anthropologist in Anthropological Survey of India; Research Officer in Indira Gandhi National Centre for the Arts. Our three students have been admitted in advanced Masters' courses in USA/Canada on the basis of their post-graduation in Anthropology from this Department.

ALUMNI ASSOCIATION: We have an Alumni Association, though in a very nascent stage. Prestigious alumni sometimes come to the Department and at that point an interaction is organized with the faculty and students. The last such interaction was with Dr. Sarabjit Mastana, of Loughborough University, U.K. and Mr. Sandeep Sharma on 3-2-2017. Dr. Sarabjit Mastana

also addressed the Department on 12-02-2019. Some years prior to this, the alumni association has held a get-together. The funding for such future meeting are being sought after.

DEPARTMENT OF BIOCHEMISTRY

ABOUT THE DEPARTMENT:

Department of Biochemistry was started in 1962 and has grown steadily and is now recognized as an important centre of research and teaching in the country. Our teaching oriented Department provides many opportunities for prospective students who can acquire thorough training and degree in contemporary Biochemistry through our honors program: B.Sc., M.Sc. and Ph.D. Our Department attracts the best students and provides an excellent foundation for future, be it in research, academics or industry.

The department has qualified, regular and competent faculty with Ph.D. from various institutes of national and international repute. The faculty members of the department are engaged in the research in the areas of Biosensors, Cancer Biology, Industrial biotechnology, Immunology, Membrane Biology, Microbial Biochemistry and Stress response, Neurobiology (fields in the order of Alphabets).The Department is recognized for funding under the Special Assistance Programme of the University Grant Commission. The Department has several sophisticated instruments such as GC-MS, High Speed Centrifuges, UV-Vis Spectrophotometers, Thermocycler, Gel-Doc, Lyophiliser, Spectrofluorimeter, HPLC, Ultracentrifuge and flowcytometer for enhancing research facilities.

The opportunities for Ph.D. are varied and designed to provide solid training as an independent and research scientist, both, in academic as well as industrial settings. Our alumni occupy important positions in India and abroad.

FACULTY

Designation	Name	Field of Research Specialization
Emeritus Professor	Akhtar Mahmood	Membrane Transport
	Jagmohan Singh	Yeast Genetics, Epigenetics, Human Genomics, Biotechnology, Synthetic Biology
Professors	Archana Bhatnagar	Immunology
	Rajat Sandhir	Neurochemistry
	Sukesh Chander Sharma	Stress Biochemistry
	Navneet Agnihotri **(Chairperson)**	Cancer Biology
	Amarjit S. Naura	Lung & Molecular Immunology
Associate Professor	Dipti Sareen	Microbial Biochemistry
Assistant Professor	Nirmal Prabhakar	Analytical Biochemistry

COURSES OFFERED: (SEMESTER SYSTEM)

Course	Seats	Duration	Eligibility*/ Admission Criteria
B.Sc. (Hons.) under the framework of Honours School System	25 + 4NRI + 2 Foreign National	3 Years	Through P.U. – CET-(U.G.) 2020 and as per university rules
M.Sc. (Biochemistry) under the framework of Honours School System	30 + 4NRI + 2 Foreign National	2 Years	B.Sc. (Hons.) Biochemistry or its equivalent exam. B.Sc. (Hons.) in any subject under CBCS with 24 Credits in Biochemistry as Generic Elective subject 50% marks in B.Sc. (Pass or Hons.) exam. of the P.U. or any other exam. recognized by P.U. as equivalent to Biochemistry as one of the elective subjects + P.U. – CET (P.G.)
Ph.D.	Subject to availability	3-6 years	See M.Phil/Ph.D. Prospectus 2021
*5 % Concession is admissible in eligibility marks to SC/ST/BC/PwD Candidates # After admitting all the ongoing students of B.Sc. (H.S.) 3rd year, vacant seats will be filled with candidates on the basis of entrance Test-PU-CET (PG). Students who have studied Biochemistry as an elective subject for three years are eligible for seeking admission. Student of B.Sc. (MLT) departments are not eligible.			

TITLE OF SYLLABI: Detailed syllabi available at https://puchd.ac.in/syllabus.php

B.Sc. (Hons.) COURSE STRUCTURE (2021-22)

SEMESTER-I		SEMESTER-II	
C1	BCH-C1: Biomolecules	C3	MIC-C3: General Microbiology
C2	BPH-C2: Cell Biology	C4	BTC-C4: Molecular Biology
AECC1	BCH-AECC1: English	AECC2	BCH: AECC2: Environmental Science
GE1*		GE2*	

Four core courses will run simultaneously in both semesters in the 1st year under PU-IBMSER.

SEMESTER III		SEMESTER IV	
C5	BCH-C5: Carbohydrates: Structure & Metabolism	C8	BCH-C8: Lipids: Structure & Metabolism
C6	BCH-C6: Nitrogenous Compounds: Structure & Metabolism I	C9	BCH-C9: Nitrogenous Compounds: Structure & Metabolism II
C7	BCH-C7: Membrane Biology & Bioenergetics	C10	BCH-C10: Enzymes & Enzyme Kinetics
SEC1**		SEC2**	

GE3*		GE4*	
SEMESTER V		**SEMESTER VI**	
C11	BCH-C11: Immunology	C13	BCH-C13: Endocrinology
C12	BCH-C12: Molecular Biology: From Genes to Proteins	C14	BCH-C14: Regulation of Gene Expression & Development
DSE1#		DSE3#	
DSE2#		DSE4#	
C:Core Courses; GE: Generic Elective; AECC: Ability Enhancement Compulsory Courses; SEC: Skill Enhancement Courses; DSE: Discipline Specific Elective. *:GE subjects are to be selected by the students from the pool of GE Subjects offered by various Departments of the University.			

****SKILL ENHANCEMENT COURSES (any one per semester in semesters 3-4)**

1. BCH-SEC1: Tools and techniques in Biochemistry
2. BCH-SEC2: Protein purification Techniques
3. BCH-SEC3: Introduction to Biomedical Lab Diagnostics
4. BCH-SEC4: Bioinformatics
5. BCH-SEC5: Recombinant DNA Technology

#DISCIPLINE SPECIFIC ELECTIVE COURSES (any two per semester in semesters 5-6)

1. BCH-DSE1: Physiological Biochemistry / Microbial Biochemistry
2. BCH-DSE2: Plant Biochemistry / Molecular Basis of Non-Infectious Human Diseases
3. BCH-DSE3: Neurobiology / Molecular Basis of Infectious Diseases
4. BCH-DSE4: Nutritional Biochemistry / Cancer Biology

** and #Courses under these will be offered only if a minimum of 10 students opt for the same.

GENERIC ELECTIVE SUBJECTS (Offered by Biochemistry Department) for students of other departments

1. BCH-C-GE1: Biochemistry of Cell
2. BCH-C-GE2: Proteins and Biomembranes
3. BCH-C-GE3: Enzymes and Bioenergetics
4. BCH-C-GE4: Intermediary Metabolism

M.Sc.

COURSE STRUCTURE (2021-22)

	SEMESTER-I		**SEMESTER-II**
1.	MBCH C1: Application of Biochemistry to Biotechnology	1.	MBCH C5: Molecular Cell Biology
2.	MBCH C2: Clinical Biochemistry	2.	MBCH C6: Advanced Enzymology
3.	MBCH C3: Biochemical Toxicology	3.	MBCH C7: Molecular & Cellular Immunology
4.	MBCH C4: Combined Practical	4.	MBCH C8: Combined Practical
5.	MBCH GE 1: Swayam – I*	5.	MBCH GE2: Swayam – II*
	SEMESTER-III		**SEMESTER-IV**
1.	MBCH C9: Genomics and Bioinformatics	1.	MBCH C14: Seminar on Advanced Topics in Biochemistry
2.	MBCH C10: Computational Techniques & Biostatistics	2.	MBCH C15: **Research work (Thesis)
3.	MBCH C11: Comprehensive Examination (Based on UGC/ CSIR Syllabus)	3.	MBCH C16: Research work (Viva-Voce)
4.	MBCH C12: Paper presentation on Recent Topics in Biochemistry		
5.	MBCH C13: Combined Practical		
6.	MBCH GE3: Swayam-III*		

***Generic Elective (GE) subjects are to be selected by the students from the following pool of subjects available on "Swayam", free education portal (https://swayam.gov.in/) as recommended by UGC.** Courses delivered through SWAYAM are available free of cost to the learners, however students wanting certification shall be registered, shall be offered a certificate on successful completion of the course, with a little fee. At the end of each course, there will be an assessment of the student through proctored examination and the marks/grades secured in this exam could be transferred to the academic record of the student. UGC has already issued the UGC (Credit Framework for online learning courses through SWAYAM) Regulation 2016 advising the universities to identify courses where credits can be transferred on to the academic record of the students for courses done on SWAYAM, as per the announcements on the UGC website.

** **Research Work**: Research Supervisor will be allotted to the student in Semester III. The work can be carried out on the following:

1) Stress Biology 2) Neuroscience 3) Immunology 4) Cancer Biology 5) Microbial Biochemistry 6) Biosensors 7)Bioinformatics

SYLLABI OF CORE COURSE OF READING (Pattern of instructions for Paper Setter)

Question papers will have FOUR sections. Examiner will set a total of Nine questions comprising TWO questions from each SECTION and ONE compulsory question of short answer types covering the whole syllabus. Students will attempt FIVE questions in all, including ONE question from each SECTION and the compulsory question. All Questions will carry equal marks, unless specified.

THRUST AREAS: Research in the department covers a spectrum of topics in modern Biochemistry. These are (i) Analyzing diseases at cellular and molecular level such as: Autoimmune diseases, Cancers, Central nervous system disorders, etc. (ii)

Assessing natural products as therapeutics (iii) Biochemical Toxicology (iv) Biosensors in diagnostics (v) Microbial Biochemistry (vi) Stress Biochemistry using yeast model.

PLACEMENTS: As a scientific discipline, biochemistry lies at the interface between biology, chemistry, pharmacology & medicine. This opens up a variety of career paths such as: Bioanalyst, R & D researcher, Ph.D. programs at premier institutes of India and abroad, teacher, scientist, food & drug analyst, pharmaceutical industry, etc.

ALUMNI RELATIONS: The alumni network of the department is well connected and is growing stronger every year. The members are spread both nationally and internationally. Their contributions have been acknowledged by various organizations and institutions. The department organizes Alumni meet so the current students can interact with their seniors and learn from them.

DEPARTMENT OF BIOPHYSICS

ABOUT THE DEPARTMENT:

Biophysics has in recent times emerged as an important interdisciplinary subject in Life Science and primarily deals with the structure, bioenergetics, dynamics and function of the biomolecules. Over the years, the discipline of biophysics has played a significant role in the growth of critical areas, which include molecular biophysics, physiological biophysics, medical physics, radiation physics, gene and protein engineering, Computational Biophysics, neuro degenerative disorders and membrane biophysics. Advances in these areas have paved newer initiatives for the designing and development of drugs and medical technologies.

The Department of Biophysics was established in 1964 and ever since is the only department in the country which offers both undergraduate and postgraduate courses in the discipline of Biophysics (Hons.). The department also offers excellent research opportunities leading to the award of Ph.D. degree. The courses being offered to the three year B.Sc.(Hons.) and two year M.Sc. students in Biophysics are planned in a way, so as to provide a broad base in the subject and are accepted in the diverse fields of biomedical sciences. Alumni from this department have been always suitably employed and many of them have occupied coveted positions in the academia, industry, medical institutions, national laboratories and prestigious research institutions in India and abroad.

The department has been given special assistance grants under UGC-SAP program, Phase DSA-I from April 2015-2020. The department is also recognized under DST-FIST Programme. In addition, the Department is availing DST PURSE Grant on a regular basis. For more details see the website http://biophysics.puchd.ac.in

FACULTY

Designation	Name	Field of Research Specialization
Professor Emeritus	G.S. Gupta	Proteomics and Cancer-Testis Antigens
UGC-BSR Faculty	D.K.Dhawan	Nuclear Medicine and Radiation Biophysics
Professors	M.L. Garg	Spectroscopic & Computational Studies of metalloproteins, Biomedical Instrumentation
	Ashwani Koul	Phytomedicine & Carcinogenesis
Assistant Professors	Avneet Saini **(Chairperson)**	Peptide Design, Structural characterization & validation
	Sarvnarinder Kaur	Phytomedicine & Carcinogenesis, Reproductive Biology
	Tanzeer Kaur	Proteomics of Pathological Calcification
	Pavitra Ranawat	Molecular Cell Physiology of Cancer
	Simran Preet	Anti-Microbial and Anti-cancer peptides
	Naveen Kaushal	Cell Biology & Molecular Immunology
UGC-FRP	Ravi Pratap Barnwal	Structural insights into protein complexes, protein RNA complexes, microRNA and noncoding (nc) RNA using solution state NMR spectroscopy
Inspire Faculty	Neha Singla	Neuroscience Toxicology

COURSES OFFERED (SEMESTER SYSTEM)

Course	Seats	Duration	Eligibility*	Admission Criteria
B.Sc. (Hons.) under the Framework of Honours School System	25 +4 NRI +1 Foreign National	3 years	A candidate should have passed 10+2 examination with at least 50 % marks with English, Physics, Chemistry, Mathematics / Biology from recognized Board /CBSE	Based on PU-CET (UG) Academics: 25% PU-CET (UG): 75%
M.Sc. (Hons.) under the Framework of Honours School System	25+4 NRI +1 Foreign National	2 years	(i) B.Sc. (Hons.) Biophysics, Panjab University, Chandigarh or any other University considered equivalent. (ii) Bachelor of Science in any other subject (such as B.Sc. Medical, Non-medical, Biotechnology, Bioinformatics etc.) (iii) Students who have passed B.Sc. (Hons.) in Biophysics from Panjab University,	Based on CET-PG Academics: 40% PU-CET (UG): 60%

			Chandigarh will be directly promoted to M.Sc. in Biophysics. However, all other applicants need to qualify the CET-PG in Biophysics conducted by the Panjab University, Chandigarh.	
Ph.D	48	3-6 years	See M.Phil / Ph.D Prospectus 2021	
* 5% Concession is admissible in eligibility marks to ST/SC/BC/PwD candidates				

TITLE OF SYLLABI: Detailed course curriculum is available at http://puchd.ac.in/syllabus.php

B.Sc. (Hons.) (Under CBCS system)

SEMESTER-I		**SEMESTER-II**	
C1	BCH-C1:Biomolecules	C3	MIC-C3: General Microbiology
C2	BPH-C2: Cell Biology	C4	BTC-C4: Molecular Biology
AECC1	**BPH-AECC1: English**	**AECC2**	**BPH-AECC2: Environmental Science**
GE1*		GE3*	
GE2*		GE4*	
SEMESTER-III		**SEMESTER-IV**	
C5	BPH-C5: Physics Of The Human Body	C8	BPH-C8: Human Physiology and Anatomy II
C6	BPH-C6: Physicochemical Techniques	C9	BPH-C9: Biophysical Chemistry
C7	BPH-C7: Human Physiology And Anatomy I	C 10	BPH-C 10: Radiation and Biomedical Instrumentation
SEC 1		SEC 2	
GE5*		GE6*	
SEMESTER-V		**SEMESTER-VI**	
C11	BCH-C11: Radiation Biophysics	C13	BPH-C13: Gene And Protein Engineering
C12	BPH-C12: Bioinformatics And Computational Biology	C14	BTC-C14: Molecular Biophysics
DSE1		DSE3	
DSE2		DSE4	

C: Core Courses; GE: General Elective; AECC: Ability Enhancement Compulsory Courses; SEC: Skill Enhancement Courses; DSE: Discipline Specific Elective

ELECTIVE/GENERAL ELECTIVE:

GENERIC ELECTIVE SUBJECTS (Offered by Biophysics Department) for students of other departments

SEMESTER-I		**SEMESTER-II**	
1.	BPH-GE1A: Human Physiology and Anatomy	1.	BPH-GE2A: Radiation Biophysics and Biomedical Instrumentation
2.	BPH-GE1B: Human Physiology and Anatomy	2.	BPH-GE2B: Radiation Biophysics and Biomedical Instrumentation
SEMESTER-III		**SEMESTER-IV**	
1.	BPH-GE3: Bioinformatics and Computational Biology	1.	BPH-GE4: Biophysical Techniques

SKILL ENHANCEMENT COURSES (any one per semester in semesters 3-4) for students of biophysics department

SEMESTER-III		**SEMESTER-IV**	
1.	BPH-SEC1: Biophysics: Industrial and Clinical Applications	1.	BPH-SEC3: Sports Medicine
2.	BPH-SEC2: Human Genetics and its Applications	2.	BPH-SEC4: Soft Skills Development

DISCIPLINE SPECIFIC ELECTIVE COURSES (any two per semester in semesters 5-6) for students of biophysics department.

SEMESTER-V		**SEMESTER-VI**	
1.	BPH-DSE1: Cytology and Cell Physiology	1.	BPH-DSE5: Neuro Biophysics
2.	BPH-DSE2: Biomedical Imaging	2.	BPH-DSE6: Gene Organization and regulation
3.	BPH-DSE3: Advanced Microscopy	3.	BPH-DSE7: Immunology
4.	BPH-DSE4: Biomaterials	4.	BPH-DSE8: Cell and Tissue culture Techniques

M.SC

SEMESTER-I		SEMESTER-II	
Compulsory Core Courses		**Compulsory Core Courses**	
MBPH-TH-C1	Molecular Basis of Gene and Protein Engineering	MBPH-TH-C5	Cell and Membrane Biophysics
MBPH-TH-C2	Methods in High Throughput Biology	MBPH-TH-C6	Medical Physics
MBPH-TH-C3	Bio-molecular Spectroscopy	MBPH-TH-C7	Programming and Statistical Data Analysis
MBPH-PR-C1	Molecular Basis of Gene and Protein Engineering	MBPH-PR-C5	Cell and Membrane Biophysics
MBPH-PR-C2	Methods in High Throughput Biology	MBPH-PR-C6	Medical Physics
MBPH-PR-C3	Bio-molecular Spectroscopy	MBPH-PR-C7	Programming and Statistical Data Analysis
MBPH-TH-C4	Advanced Topics in Biophysics	MBPH-PR-C4	Research Laboratory Rotation

SEMESTER-III		SEMESTER-IV	
Compulsory Core Courses		**Compulsory Core Courses**	
MBPH-TW-C9	Thesis Work-Part I	MBPH-TH-C10	Nobel Prize Winning Studies
MBPH-TH-C8	Comprehension of the NET syllabus for Life Sciences		
Discipline Specific Elective Courses (Select any two Courses)@		**Discipline Specific Elective (Select any One Course**)**	
MBPH-DSE1	Radiation Biophysics*	MBPH-TW1	Radiation Biophysics
MBPH-DSE2	Physicochemical Techniques*	MBPH-TW2	Biomedical Instrumentation and Molecular Spectroscopy
MBPH-DSE3	Human Physiology and Anatomy*	MBPH-TW3	Cancer Biology
MBPH-DSE4	Molecular Biology*	MBPH-TW4	Phytomedicine and Molecular Biology
MBPH-DSE5	Physics of Human Body*	MBPH-TW5	Computational Biophysics and Biophysical Chemistry
MBPH-DSE6	Biophysical Chemistry*	MBPH-TW6	Pathological Calcification and Toxicology
MBPH-DSE7	Neurobiophysics#	MBPH-TW7	Phytomedicine
MBPH-DSE8	Advanced Microscopy#	MBPH-TW8	Anticancer Peptides and Cancer Biology
MBPH-DSE9	Nanobiophysics	MBPH-TW9	Cell and Molecular Immunology
MBPH-DSE10	Principles of radiation Protection and Radiation Safety	MBPH-TW10	Structural Biology, Protein and RNA Biogenesis
MBPH-DSE11	Molecular Modeling and Computer Aided Drug Design		
MBPH-DSE12	Cancer Biology		
Generic Elective Courses (Select any one Course)			
MBPH-GE1$			
MBPH-GE2$			
MBPH-MOOC1^^	Bio organic and Biophysical Chemistry		
MBPH-MOOC2^^	Biomolecules: Structure, function in Health and Disease		
MBPH-MOOC3^^	Biostatistics		

@ Discipline Elective Courses will be offered only if a minimum 7 seven students opt for it and also on the availability of the faculty

***** only for students who have taken admission directly in M.Sc. Biophysics program of P.U. (without doing B.Sc. Biophysics from P.U.)

for students who have not studied this subject in B.Sc. V or VI semester.

$ Student may opt for any **one** of the Generic Elective Courses studied in M.Sc. offered by the Science Departments (other than the Biophysics department) of Panjab University. The course must be approved by the Academic Committee of the department followed by its approval by BOC.

^^ A course under the code MBPH-MOOC1-3 can be selected from the available UGC MOOCs Courses: A Vertical of SWAYAM-Inflibnet. The course must be approved by the Academic Committee of the department followed by its approval by BOC.

** Allotment shall be on merit basis of the result of Semester I and II. Thesis must be submitted by 31st July of every academic year, failing which it shall be counted as Re-appear.

THRUST AREAS: Cancer Biology, Neuro-biophysics and Drug Discovery.

PLACEMENT: The Department of Biophysics has an active placement cell which helps, supports and encourages the students for venturing into the fields of their respective interests.
In this regard, Department organizes regular seminars and talks in collaboration with central placement cell of PU, where distinguished alumni from various fields are invited to discuss the scope of Biophysics, emphasizing on the placement scenario and opportunities in the field.
ALUMNI RELATIONS: Department keeps constant contact with its alumni whether in India or abroad. Whenever, they visit the department there is always an interaction with faculty and students. Prior to their visit, most of the alumni inform the department about their visit and if the alumni are active in academia/research then the dept. plans their lecture or informal interaction with the students. The alumni also help in placement of the students in academia and research. The Department holds alumni meets at regular intervals.

DEPARTMENT OF BIOTECHNOLOGY

ABOUT THE DEPARTMENT

The Department came into existence as Centre in 1989. In 1993 after obtaining financial aid from UGC and DBT, Govt. of India, it was upgraded to the level of full-fledged Department. The Department is rated as one of the best in India for imparting state of art technology to the students in the field of biotechnology. Most of the students qualify UGC and CSIR entrance test in their first attempt and are admitted to Ph.D. programs in prestigious research institutions in India. Most of the faculty members have been trained abroad and are recipient of prestigious National and International awards. The faculty of the department publishes research papers in National and International journals on regular basis. Every year department organizes workshop/symposium / seminar dealing with state of art technologies. Department also organizes a seminar on "Frontiers in Biotechnology" for B.Sc. and M.Sc. students on regular basis. Scientists of international repute are invited to deliver lectures. The department has the distinction of being funded by DST-FIST (2002-07; 2011-16) and UGC-SAP (2007-12; 2013-18).

FACULTY

Designation	Name	Field of Research Specialization
Professor Emeritus	R.C. Sobti	Molecular Diagnosis of Cancer
Professors	Jagdeep Kaur	Enzymology/Protein Engineering, Cancer Biology
	Neena Capalash	Microbial Biotechnology & Cancer Biology
	Jagtar Singh	Immunology & Molecular Epidemiology, Animal Biotechnology
	Desh Deepak Singh	Bioinformatics and Structural Biology
Associate Professor	Kashmir Singh **(Chairperson)**	Plant Biotechnology
Assistant professor (UGC – FRP)	Santosh Kumar	Molecular Genetics, Cell Biology and Biochemistry

COURSES OFFERED (SEMESTER SYSTEM)

Course	Seats	Duration	Eligibility	Admission Criteria
B.Sc. (Hons.)	15 General + 02 NRI + 1 Foreign National	3 years	50% marks in 10+2 or equivalent examination with the subjects English, Physics, Chemistry, Mathematics / Biology.	Based on PU CET (UG) P.U.CET (UG) : 75% Qualifying Exam: 25%
M.Sc.	Ongoing Class	2 years	For ongoing class: Passed B.Sc. (Hons.) Biotechnology from Panjab University.	Ongoing Class
	5 General + 2 SC +2 NRI		B.Sc. Biotechnology (50% marks) / B.Sc. with 50% marks with biotechnology as elective / vocational subject (Studied for 3 years) are eligible.	Based on PU CET-(PG) Academics: 40% P.U. CET (UG): 60%
Ph.D.	Subject to availability	3-6 years	See M.Phil/Ph.D. Prospectus 2021	Candidates who have cleared UGC-NET/CSIR -NET) / GATE Examination / SLET/ Teacher Fellowship holders / direct awardees of fellowship by any national agency or any other equivalent test. Candidates who have cleared P.U. Entrance Test.
*5% Concession is admissible in eligibility requirement to SC/ST/BC/PWD candidates. ** The candidates seeking admission in M.Sc. Biotechnology should fill separate admission forms in colleges offering M.Sc. course in Biotechnology. No Centralized Counselling will be done by the Department.				

TITLE OF SYLLABI : Detailed course curriculum is available at http://puchd.ac.in/syllabus.php

B.Sc. (Hons.)

	Semester-I		Semester - II
Paper-1	General Microbiology	Paper-1	Biomolecules
Paper-2	Molecular Biology	Paper-2	Cell Biology
Paper-3	English	Paper-3	Environment Education

Paper-4	Generic Elective 1	Paper-4	Generic Elective 2
	Semester-III		**Semester- IV**
Paper-1	Chemistry	Paper-1	Biochemistry and Metabolism
Paper-2	Enzymology	Paper-2	Bio Analytical Tools
Paper-3	Plant Physiology	Paper-3	Bioprocess Technology
Paper-4	Skill Enhancement Course 1	Paper-4	Skill Enhancement Course 2
Paper-5	Generic Elective 3	Paper-5	Generic Elective 4
	Semester-V		**Semester- VI**
Paper-1	Animal Biotechnology	Paper-1	Immunology
Paper-2	Recombinant Biotechnology	Paper-2	Plant Biotechnology
Paper-3	Discipline Specific Elective 1	Paper-3	Discipline Specific Elective 3
Paper-4	Discipline Specific Elective 2	Paper-4	Discipline Specific Elective 4

SYLLABUS 2021-22: M.Sc. Biotechnology under CBCS (http://puchd.ac.in/syllabus.php):

	Semester-I		**Semester - II**
Paper-1	Animal Cell Culture Technology	Paper-1	Bioinformatics
Paper-2	Advanced Immunology	Paper-2	Microbial Biotechnology
Paper-3	Advanced Recombinant DNA Technology	Paper-3	Entrepreneurship Development
Paper-4	Advanced Molecular Biology	Paper-4	Scientific Writing & Project Management
	Semester-III		**Semester- IV**
Paper-1	Animal Biotechnology		Research Project a) Thesis b) Presentation & Viva c) Internal Assessment
Paper-2	Plant Biotechnology		
Paper-3	Emerging Technologies		
Paper-4	**†Electives (any one to be opted)**		
	Molecular Medicine		
	Food Microbiology and Food Safety		
Paper-5	Trends in Biotechnology		

PH.D COURSE WORK (ONE SEMESTER):
Research methodology, Basic & Modern Analytical Techniques in Biotechnology, Presentations.

THRUST AREAS:
Molecular Epidemiology, Microbial Biotechnology, Plant Biotechnology, Recombinants, Glycobiology of Infectious Diseases.

PLACEMENTS:
Faculty of the department provides career counseling to the students and helps them to choose profession of their choice. More than 50% PG students prefer to join Ph.D after clearing competitive exams (UGC/CSIR/DBT/ICMR NET *etc.*). Few of our students are doing Ph.D in countries like US, Canada, EU *etc*. after completing Ph.D. students are placed in teaching/research institutes and a few go abroad for Postdoctoral fellowships. The Department provides a platform to encourage the students for joining private sector in the field of biotechnology.

ALUMNI RELATIONS:
The Department maintain the record of pass out students and time to time invites past students to interact with present students by conducting seminars, symposia *etc.*

DEPARTMENT OF BOTANY

ABOUT THE DEPARTMENT
The Department of Botany was established in 1919 at Lahore. It shifted to Chandigarh in 1960 from Khalsa College, Amritsar where it was housed temporarily after partition of the country. The Department has grown into a well recognised centre for higher learning and research in structural, functional and evolutionary aspects of plants. The department had DST-FIST programme and had completed UGC DRS-II phase. Some of the major areas of research are: taxonomy, morphology, improvement and propagation of economically important plants, ecology of invasive alien plants, physiological up-gradation of harvest index of some important crops; stress biology of legumes; identification of eco-friendly herbicides and pesticides; mushroom cultivation; evaluation and conservation of plant diversity; importance of microbes in human welfare and molecular characterization of gene families involved in development and stress responses. In addition to teaching through modern techniques, seminars, symposia, workshops, the invited lectures and botanical excursions are an integral part of academic programme. The department has a well-stocked library with nearly 6,814 books and over 60 regular scientific journals. The department also houses an internally recognized Herbarium (abbreviated as PAN) and a Museum. The P.N. Mehra Botanical Garden, spread over 16 acres of land is one of the better-known botanical gardens attached to any university of the country. The department has been getting regular sanction for BSR fellowships under UGC-SAP (DRS-III) programme. Additionally, the UGC also sanctions funds to the department for infrastructural development from time to time. Besides this, many research projects are being funded by DST, MoEF, UGC, CSIR, DBT, SERB and MoFPI. The Department has received DST FIST Grant for a period of 5 years and RUSA Grant respectively starting from 2020.

FACULTY

Particulars	**Name**	**Field of Research Specialization**

Honorary Professor	S.S. Chahal	Plant Pathology
Prof. Emeritus	S.C. Verma	Cytogenetics
	M.L. Sharma	Angiosperm taxonomy and grasses
	S.S. Kumar	Bryology
	S.P. Khullar	Pteridophytes
Professors	Daizy Rani **(Chairperson)**	Plant Ecology (Eco-Physiology)
	Harsh Nayyar	Plant Physiology
	P. Pathak	Morphology and Morphogenesis
	C. Nirmala	Cytogenetics, Molecular Biology and Biotechnology
	Sunita Kapila	Bryology
	Richa Puri	Biosystematics & Seed Physiology
	Neera Garg	Plant Physiology
	Kamaljit Singh	Plant Physiology and Biochemistry
	M.C. Sidhu	Cytogenetics / Plant Breeding
Associate Professor	Anju Rao	Plant Morphogenesis
Assistant Professors	A.N.Singh	Ecology
	Shalinder Kaur	Eco-physiology
	Santosh K. Upadhyay	Plant Molecular Biology
	Jaspreet Kaur	Tissue Culture and Molecular Biology
	Papiya Mukherjee	Cryo-Biology and Molecular Biology

COURSES OFFERED (SEMESTER SYSTEM)

Courses	Seats	Duration	Eligibility*	Admission criteria
B.Sc. (Hons.) under the framework of Honours School System	20+3 NRI+1 Foreign National	3 years	10+2 examination with atleast 50% marks with Physics, Chemistry, Biology and English from recognized Board / CBSE	Based on PU-CET (UG) Academics: 25% PU-CET(UG):75%
M.Sc. (Botany) under the framework of Honours School System	25+4 NRI+1 Foreign National	2 years	B.Sc. (Hons) or (Pass or Hons.) with 50% marks from PU or any other recognized University or any other exam as equivalent thereto with Botany as one of the elective subject.	Based on PU-CET (PG) Academics: 40% PU-CET(PG):60%
M.Phil	15	1 year	See M.Phil/Ph.D Prospectus 2021	
Ph.D	15	3-6 years	See M.Phil/Ph.D Prospectus 2021	
* 5% concession is admissible in eligibility marks to SC/ST/BC/PwD candidates				

TITLES OF SYLLABI: Detailed course curriculum is available at https://puchd.ac.in/syllabus.php

B.Sc. (Honours) Semester I -VI Botany (Under the framework of Honours School System)

SEMESTER-I	SEMESTER-II
BOT-C1: Phycology & Microbiology	BOT-C3: Mycology & Phytopathology
BOT-C2: Biomolecules & Cell Biology	BOT-C4: Archegoniates
Practical C-1	Practical C-3
Practical C-2	Practical C-4
BOT-AECC1: English	BOT-AECC2: Environment Science
BOT-GE1: Biodiversity (Microbes, Algae, Fungi and Archegoniate)	BOT-GE2: Plant Anatomy and Embryology
Practical GE-1	Practical GE-2
SEMESTER-III	**SEMESTER-IV**
BOT-C5: Plant Anatomy	BOT-C8: Molecular Biology
BOT-C6: Economic Botany	BOT-C9: Plant Ecology & Phytogeography
BOT-C7: Basics of Genetics	BOT-C10: Plant Systematics
Practical C-5	Practical C-8
Practical C-6	Practical C-9
Practical C-7	Practical C-10
SEC-1: Biofertilizers	SEC-5: Medicinal Botany
GE-3: Economic Botany & Plant Biotechnology	GE-4: Plant Ecology and Taxonomy
GE-3 Practical	GE-4 Practical
SEMESTER-V	**SEMESTER-VI**
BOT-C11: Reproductive Biology of Angiosperms	BOT-C13: Plant Metabolism
BOT-C12: Plant Biotechnology	BOT-C14: Plant Physiology
Practical C-11	Practical C-13
Practical C-12	Practical C-14
DSE-4: Plant Breeding	DSE-2: Bioinformatics
DSE-7: Research Methodology	DSE-5: Natural Resource Management
DSE-4: Practical	DSE-2: Practical
DSE-7: Practical	DSE-5: Practical

M.Sc

SEMESTER-I	SEMESTER-II
BOT-Core-1001: Plant Physiology	BOT-Core-2001: Phycology
BOT-Core-1002: Principles of Ecology	BOT-Core-2002: Plant Biotechnology
BOT-Core-1003: Bryology	BOT-Core-2003: Mycology and Plant Pathology
BOT-Core-1004: Pteridology	BOT-Core-2004: Genomics
BOT-Core-1005: Plant Resource Utilization and Conservation	BOT-Core-2005: Cytogenetics and Plant Breeding
SEMESTER-III	**SEMESTER-IV**
Paper-I: Plant Biochemistry	Paper-I: Gymnosperms
Paper-II: Cell & Molecular Biology	Paper-II: Environment Botany
Paper-III: Angiosperms : Phylogeny, Embryology and Taxonomy	Paper-III: Field Study
Paper-IV: Seminars	Paper-IV: Project Work
Elective Courses (Two Courses to be selected out of four offered)	**Elective Courses (Three Courses to be selected out of six offered)**
Paper-I: In vitro Technologies and Industrial Applications	Paper-I: Advances in Ecology
Paper-II: Urban Environment	Paper-II: Advances in Plant Biochemistry
Paper-III: Agroecology & Sustainable Agriculture	Paper-III: Advances in Molecular Biology
Paper-IV: Plant Morphogenesis	Paper-IV: Microbial Technology
	Paper-V: Recombinant Proteomics
	Paper-VI: Advanced topics in Plant Physiology

THRUST AREAS: Plant Physiology, Plant Ecology, Plant Biotechnology, Plant Biochemistry, Phychology, Mycology, Bryology, Taxonomy, Physiology, Cytology.

PLACEMENT: The department has a Placement Cell which Co-ordinates with Central Placement Cell of the University to get time to time information about the opportunities available to the students of the Department.

ALUMNI RELATIONS: The Department has alumni association i.*e.,* Panjab University Botany Department Alumni Association (PUBDAA), which has Executive Committee and several members. The department organizes Alumni Meet every year to maintain contact with the alumni as well as to provide the information about the latest happenings of the department to members. Several of its alumni are highly distinguished and working in different capacities at National and International levels.

DEPARTMENT OF CHEMISTRY

ABOUT THE DEPARTMENT

Founded by Dr. S. S. Bhatnagar at Lahore in 1925, the Department of Chemistry is one of the prestigious Departments of Panjab University. It has on its faculty highly competent members whose work has been internationally recognized. Several faculty members are recipients of awards and honours, such as Shanti Swarup Bhatnagar, Jawaharlal Nehru Fellowship, Raman and Palit awards. Many faculty members are bestowed with F.N.A., F.A.Sc., F.N.A.Sc. The Department has been selected by the UGC first for COSIST and Special Assistance Programme (SAP) and it is the Centre of Advanced Studies in Chemistry (CAS) for the last 16 years. The Department of Science and Technology (DST), Government of India has accorded it the status of "DST-FIST Supported Department". The Department has stimulating undergraduate and postgraduate teaching programmes. Frequent symposia, conferences, invited lectures and refresher courses have been organized for the benefit of University, College and School teachers and talented students. The Department has good instrumental facilities and its library is perhaps one of the best in Northern India with its excellent collection of books, research journals and monographs. The Department is well-known for its research activities and has very well equipped research Laboratories**.**

FACULTY

Particular	Name	Field of Research Specialization
Honorary Professor	T. Ramasami	
Professors Emeritus	S. V. Kessar	Organic
	Gurdev Singh	Inorganic
	D. S. Gill	Analytical
NASI-Senior Scientist	K. K. Bhasin	Inorganic
Professors	S. K. Mehta	Physical
	P. Venugopalan	Inorganic/Analytical
	Alok Srivastava	Physical
	Kamal Nain Singh **(Chairperson)**	Organic
	Ganga Ram Chaudhary	Physical
	Sonal Singhal	Inorganic
	Navneet Kaur	Organic
	Gurjaspreet Singh	Inorganic
	Vikas	Physical
Associate Professors	Neetu Goel	Physical
Assistant Professors	Amarjit Kaur	Organic
	Aman Bhalla	Organic
	Navneet Kaur	Organic
	Varinder Kaur	Inorganic
	Shweta Rana	Physical

	Rohit Kumar Sharma	Organic
	Ramesh Kataria	Inorganic
	Subash Chandra Sahoo	Inorganic
	Gurpreet Kaur	Physical
	Savita Chaudhary	Physical
	Deepak B. Salunke	Organic
	Palani Natarajan	Inorganic
	Jyoti Agarwal	Organic
UGC Assistant Professors (FRP)	Purshotam Sharma	Physical
	Ankur Ganesh Pandey	Organic
	Abhijit Dan	Physical
	Vijay Pal Singh	Inorganic
Assistant Professors (Inspire Faculty)	Girijesh Kumar	Inorganic
	Vaneet Saini	Organic
Assistant Professor (Temporary Faculty)	Khushwinder Kaur	Physical

COURSES OFFERED (SEMESTER SYSTEM)

Courses	Seats	Course	Eligibility*	Admission Criteria
B.Sc. (Hons.) under the framework of Honours School System	58 + 8 NRI + 3 Foreign National	3 years	Passed 10+2 examination from recognized Board/ CBSE with at least 50% marks with Physics, Chemistry, Mathematics, Biology and English.	Based on PU-CET (UG) Academics: 25% PU-CET(UG): 75%
M.Sc. (Chemistry) under the framework of Honours School System	Ongoing students	2 years	Passed B.Sc. (Hons.) in Chemistry from Department of Chemistry, P.U.	----------
	15+2 NRI+1 Foreign National		(ii) B.Sc. (Pass or Hons.) examination with 50% marks from PU or any other University recognized as equivalent thereto with (a) Chemistry in all the three years / six semesters, and (b) any two science subjects during two years/four semesters during graduation. (iii) B.Sc. (Hons.) in any subject under Choice-based Credit System with 24 Credits in Chemistry as Generic Elective Subject.	Based on PU-CET (PG) Academics: 40% PU-CET(PG): 60%
Ph.D.		3-6 years	See M.Phil./Ph.D. Prospectus -2021.	
*5% concession is admissible in eligibility marks to SC/ST/BC/PwD candidates				

TITLE OF SYLLABI: Detailed course curriculum is available at **http://puchd.ac.in/syllabus.php?qstrfacid=10**

B.Sc (Hons.)

Semester I
CORE COURSE (CHEMISTRY)

Theory Papers:

Core Course-1 (C 1):	Inorganic Chemistry-I	100 Marks (4 credits)
Core Course-2 (C 2):	Physical Chemistry-I	100 Marks (4 credits)

Practicals:

Core Course-1 Practical (C 1 Lab):	Inorganic Chemistry-I	50 Marks (2 credits)
Core Course-2 Practical (C 2 Lab):	Physical Chemistry-I	50 Marks (2 credits)

GENERIC ELECTIVE (GE) FOR CHEMISTRY STUDENTS

Each student of Chemistry Department has to opt two Generic Elective Courses from the available options offered by different science, mathematics, computer science and economics departments. However, a student can take only one GE course from one department per semester.

ABILITY ENHANCEMENT COMPULSORY COURSE FOR CHEMISTRY STUDENTS

Each student of Chemistry Department has to opt one Ability Enhancement Compulsory Course of the following:

1. English Communication (2 credits)

2. Environmental Science (2 credits)

GENERIC ELECTIVE (CHEMISTRY)

Theory Papers:
A student from other disciplines may opt one of the generic electives offered by the Chemistry Departments of Panjab University out of following:

Generic Elective (GE-1A)	Atomic structure, bonding, general organic chemistry & aliphatic hydrocarbons	100 Marks (4 credits)
Generic Elective (GE-1B)		100 Marks (4 credits)

Practicals:

Generic Elective (GE-1A)	50 Marks (2 credits)
Generic Elective (GE-1B)	50 Marks (2 credits)

Semester II
CORE COURSE (CHEMISTRY)

Theory Papers:

Core Course-3 (C 3):	Organic Chemistry-I	100 Marks (4 credits)
Core Course-4 (C 4):	Physical Chemistry-II	100 Marks (4 credits)

Practicals:

Core Course-3 Practical (C 3 Lab):	Organic Chemistry-I	50 Marks (2 credits)
Core Course-2 Practical (C 4 Lab):	Physical Chemistry-II	50 Marks (2 credits)

GENERIC ELECTIVE (GE) FOR CHEMISTRY STUDENTS

Each student of Chemistry Department has to opt two Generic Elective Courses from the available options offered by different science, mathematics, computer science and economics departments. However, a student can take only one GE course from one department per semester.

ABILITY ENHANCEMENT COMPULSORY COURSE FOR CHEMISTRY STUDENTS

Each student of Chemistry Department has to opt one Ability Enhancement Compulsory Course of the following:
1. English Communication (2 credits)
2. Environmental Science (2 credits)

GENERIC ELECTIVE (CHEMISTRY)

Theory Papers:
A student from other disciplines may opt one of the generic electives offered by the Chemistry Departments of Panjab University out of following:

Generic Elective (GE-2A)	Chemistry of Main Group Elements & functional organic chemistry	100 Marks (4 credits)
Generic Elective (GE-2B)		100 Marks (4 credits)

Practicals:

Generic Elective (GE-2A)	50 Marks (2 credits)
Generic Elective (GE-2B)	50 Marks (2 credits)

Semester III
CORE COURSE (CHEMISTRY)

Theory Papers:

Core Course-5 (C 5):	Inorganic Chemistry-II	100 Marks (4 credits)
Core Course-6 (C 6):	Organic Chemistry-II	100 Marks (4 credits)
Core Course-7 (C 7):	Physical Chemistry-III	100 Marks (4 credits)

Practicals:

Core Course-5 Practical (C 5 Lab):	Inorganic Chemistry-II	50 Marks (2 credits)
Core Course-6 Practical (C 6 Lab):	Organic Chemistry-II	50 Marks (2 credits)
Core Course-7 Practical (C 7 Lab):	Physical Chemistry-III	50 Marks (2 credits)

SKILL ENHANCEMENT COURSES

Each student of Chemistry Department has to opt one Skill Enhancement Compulsory Course of the following:

1.	CHE-SEC1: Industrial Chemistry of Fuels	50 Marks (2 credits)
2.	CHE-SEC2: Basic Analytical Chemistry	50 Marks (2 credits)
3.	CHE-SEC3: Pesticide Chemistry	50 Marks (2 credits)

GENERIC ELECTIVE (GE) FOR CHEMISTRY STUDENTS

Each student of Chemistry Department has to opt one Generic Elective Course from the available options offered by different science, mathematics, computer science and economics departments. However, a student can take only one GE course from one department per semester.

GENERIC ELECTIVE (CHEMISTRY)

Theory Papers:

A student from other disciplines may opt following generic elective offered by the Chemistry Departments of Panjab University out of:

Generic Elective (GE-3)	Chemical Energetics, Equilibria and Transition Metal & Coordination Chemistry, Theories of Acids & Bases	100 Marks (4 credits)

Practicals:

Generic Elective - Practical (GE-3 Lab)	50 Marks (2 credits)

Semester IV

CORE COURSE (CHEMISTRY)

Theory Papers:

Core Course-8 (C 8):	Inorganic Chemistry-III	100 Marks (4 credits)
Core Course-9 (C 9):	Organic Chemistry-III	100 Marks (4 credits)
Core Course-10 (C 10):	Physical Chemistry-IV	100 Marks (4 credits)

Practicals:

Core Course-8 Practical (C 8 Lab):	Inorganic Chemistry-III	50 Marks (2 credits)
Core Course-9 Practical (C 9 Lab):	Organic Chemistry-III	50 Marks (2 credits)
Core Course-10 Practical (C 10 Lab):	Physical Chemistry-IV	50 Marks (2 credits)

SKILL ENHANCEMENT COURSES

Each student of Chemistry Department has to opt one Skill Enhancement Compulsory Course of the following:

1.	CHE-SEC4: Pharmaceutical Chemistry	50 Marks (2 credits)
2.	CHE-SEC5: Chemical Technology & Society	50 Marks (2 credits)
3.	CHE-SEC6: Chemistry of Cosmetics and Perfumes	50 Marks (2 credits)

GENERIC ELECTIVE (GE) FOR CHEMISTRY STUDENTS

Each student of Chemistry Department has to opt one Generic Elective Course from the available options offered by different science, mathematics, computer science and economics departments. However, a student can take only one GE course from one department per semester.

GENERIC ELECTIVE (CHEMISTRY)

Theory Papers:

A student from other disciplines may opt following generic elective offered by the Chemistry Departments of Panjab University out of:

Generic Elective (GE-4)	Molecules of life, Spectroscopy, states of matter & chemical kinetics	100 Marks (4 credits)

Practicals:

Generic Elective -Practical (GE-4 Lab)	50 Marks (2 credits)

SEMESTER-V

CORE COURSE (CHEMISTRY)

Theory Papers:		
Core Course-11 (C 11):	Organic Chemistry-IV	100 Marks (4 credits)
Core Course-12 (C 12):	Physical Chemistry-V	100 Marks (4 credits)

Practicals:		
Core Course-11 Practical (C 11 Lab):	Organic Chemistry-IV	50 Marks (2 credits)
Core Course-12 Practical (C 12 Lab):	Physical Chemistry-V	50 Marks (2 credits)

DISCIPLINE SPECIFIC ELECTIVE COURSES

Each student of Chemistry Department has to opt for two Discipline Specific Elective Courses of the following:

Theory Papers:		
CHE-DSE1:	Green Chemistry	100 Marks (4 credits)
CHE-DSE2:	Analytical Methods in Chemistry	100 Marks (4 credits)
CHE-DSE3:	Inorganic Materials of Industrial Importance	100 Marks (4 credits)
CHE-DSE4:	Polymer Chemistry	100 Marks (4 credits)

Practicals:		
CHE-DSE1:	Green Chemistry	50 Marks (2 credits)
CHE-DSE2:	Analytical Methods in Chemistry	50 Marks (2 credits)
CHE-DSE3:	Inorganic Materials of Industrial Importance	50 Marks (2 credits)
CHE-DSE4:	Polymer Chemistry	50 Marks (2 credits)

SEMESTER-VI

CORE COURSE (CHEMISTRY)

Theory Papers:		
Core Course-13 (C 13):	Inorganic Chemistry-IV	100 Marks (4 credits)
Core Course-14 (C 14):	Organic Chemistry-V	100 Marks (4 credits)

Practicals :		
Core Course-13 Practical (C 13 Lab):	Inorganic Chemistry-IV	50 Marks (2 credits)
Core Course-14 Practical (C 14 Lab):	Organic Chemistry-V	50 Marks (2 credits)

DISCIPLINE SPECIFIC ELECTIVE COURSES

Each student of Chemistry Department has to opt for two Discipline Specific Elective Courses of the following:

Theory Papers:		
CHE-DSE5:	Applications of Computers in Chemistry	100 Marks (4 credits)
CHE-DSE6:	Colloidal Chemistry	100 Marks (4 credits)
CHE-DSE7:	Strategies in Organic Synthesis	100 Marks (4 credits)
CHE-DSE8:	Properties of Coordination Compounds & Group Theory	100 Marks (4 credits)

Practicals:		
CHE-DSE5:	Applications of Computers in Chemistry	50 Marks (2 credits)
CHE-DSE6:	Colloidal Chemistry	50 Marks (2 credits)
CHE-DSE7:	Strategies in Organic Synthesis	50 Marks (2credits)
CHE-DSE8:	Properties of Coordination Compounds & Group Theory	50 Marks (2 credits)

M.Sc. (Chemistry) Semester-I (Marks: 500)

Parent Department (Core Courses)				
Paper	**Title**	**Max. Marks**	**Con. Hours**	**Total Credits**
Core 1	Group Theory and X-ray Crystallography	100	4	4
Core 2	Organic Synthesis	100	4	4
Core 3	Quantum Chemistry	100	4	4
Core 4	Organic Spectroscopy	100	4	4
Core 5	Advanced Practicals	100	6	4

Total credits: 20

M.Sc. (Chemistry) Semester-II (Marks: 500)

Parent Department (Core Courses)				
Paper	**Title**	**Max. Marks**	**Con. Hours**	**Total Credits**
Core 6	Transition Metal Chemistry	100	4	4
Core 7	Pericyclic and Asymmetric Synthesis	100	4	4
Core 8	Colloids, Surfaces and Macromolecules	100	4	4
Core 9	Inorganic Spectroscopy and Nuclear Chemistry	100	4	4
Core 10	Computer Practical & Computational Chemistry	100	6	4
Total credits: 20				

M.Sc. (Chemistry) Semester-III (Marks: 500)

Parent Department (Core courses)				
Paper	**Title**	**Max. Marks**	**Con. Hours**	**Total Credits**
Core 11	Bioinorganic Chemistry	100	4	4
Core 12	Chemistry of Natural Products	100	4	4
Core 13	Advanced Statistical Thermodynamics and Molecular reaction dynamics	100	4	4
Elective 1 and 2	Research Project Work (Departmental Elective) (including CBT)	200	24	8
Total credits: 20				

M.Sc. (Chemistry) Semester-IV (Marks: 500)

Parent Department				
Paper	**Title**	**Max. Marks**	**Con. Hours**	**Total Credits**
Core 14	Cages and Clusters	100	4	4
Core 15	Bio-organic Chemistry and Organic Macromolecules	100	4	4
Core 16	Electrochemistry and Materials Chemistry	100	4	4
Elective 3 and 4	Research Project Work (Departmental Elective)	200	24	8
Total credits: 20				

THRUST AREAS: Synthetic Chemistry (Both Inorganic and Organic), Heterocyclic, Natural Products and Green Chemistry, Nanotechnology and Nuclear Chemistry, Colloidal, Biophysical, Theoretical and Computational Chemistry.

PLACEMENT: Many Post-graduate students pursue career in teaching and research after qualifying CSIR/UGC National Eligibility Test (NET). Our Students are absorbed for job/research in premier institutions like IISc, TIFR, BARC, DRDO, ISRO, IMSC, IIT, NCL, NPL and IISER. GATE/GRE qualified students get avenues for professional studies in India/Abroad. Some graduate students go for Post- graduate studies at TIFR, IISc, IMSc, IITs and various Central Universities. Students also find jobs through PU Central Placement Cell besides the Placement Cell of the department.

ALUMNI RELATIONS: Chemistry department has produced many distinguished alumni, who have adored both administrative / executive and scientific positions in our country and abroad. The department has an association named "Chemistry Department Alumni Association, Panjab University (CDAAPU). Annual meeting of the alumni is a regular feature. Executive members of the alumni association meet frequently to discuss the activities of the association. CDAAPU provides fellowships to needy students out of the interest accrued from contribution of alumni of 1968 batch.

DEPARTMENT OF COMPUTER SCIENCE AND APPLICATIONS

ABOUT THE DEPARTMENT

The Department of Computer Science and Applications was set up as a Centre in 1983. It got the status of the Department of Computer Science and Applications in 1997. The department offers various professional educational programmes like Ph.D. programme, Master of Computer Applications (MCA – Morning) a three-year full time course, MCA (Self Financing) – a 3-year full time self-financing course and M. Sc. Computer Science under the framework of Honours School System. For these Post Graduate degree courses, admissions are held through an entrance test conducted by the Panjab University. The quality of input is really good as both Indian as well as foreign students are attracted towards these programmes.

The department has qualified, regular and competent faculty members with Ph.D./ M.Tech / MCA (UGC NET) qualifications. Being a professional course, the curriculum is revised regularly to keep abreast of the latest advancements in the industry as well as the academia. Almost all the students at DCSA are well placed in various reputed companies. The department has an excellent infrastructure including laboratories, library, Internet facility, wireless networks and teaching – learning aids like smart classrooms. The faculty is performing and guiding research in different areas of Computer Science and Applications.

FACULTY

Designation	Name	Field of Research Specialization
Professor (re-employed)	M. Syamala Devi	Distributed Artificial Intelligence, Image Processing, Educational Technology
Professors	Ravinder Kumar Singla	Software Engineering, Web Semantics, Computer Network / Security
	Indu Chhabra	Neural Networks, Image Processing, Data Mining, Software Engineering
	Sonal Chawla	Semantic Web Applications, Programming Languages, Advanced Databases, Operating System
	Anu Gupta	Software Engineering, Open Source Software, Cloud Computing, Java Programming
Assistant Professors	Jasleen Kaur Bains	Java Programming, Image Processing, Pattern Recognition
	Rohini Sharma (**Chairperson)**	Network Security, Design and Analysis of Algorithms
	Balwinder Kaur	RDBMS, Software Engineering, Operating System, Data Warehouse and Data Mining, Computer Organization
	Anuj Kumar	Image Processing, Pattern Recognition, Open Source Software
	Anuj Sharma	Pattern Recognition, Machine Learning
	Kavita Taneja	Mobile Ad Hoc Networks, Web Information Computing, Database Management System
	Supreet Kaur Mann	Wireless Sensor Networks, Networking

COURSES OFFERED (SEMESTER SYSTEM)

Course	Seats	Duration	Eligibility	Admission Criteria
M. Sc. Computer Science under the framework of Honours School System	11+2 NRI +1 Foreign National	2 years	BCA / B.Sc.(Hons.) Computer Science / B.Tech. / B.E. (Computer Science/ Engineering) or any other examination recognized as equivalent with 50% marks(**) thereto. Candidates who have studied computer science as one of the subject for three years are not eligible (for example, B.Sc with Physics, Mathematics and Computer Science / Applications)	Based on P.U. CET- (P.G.) Academics: 40% PU-CET(PG): 60%
M.C.A. M.C.A. (Evening)	34+ 2*+5 NRI +2 Foreign National	3 years 3 years	The minimum qualification for admission to the first year of the course is: i. A recognized first degree of minimum three years duration in any discipline with at least 50% marks(**) and with Mathematics at 10+2 or at graduation level (all three years) OR	Based on P.U. CET- (P.G.)

Self-financing	46 + 2*+6 NRI +2 Foreign National		ii. B.C.A. from Panjab University with 50% marks(**) OR iii. B.Voc (Software Development), B.Voc (Hardware and Networking) & B.Voc Multimedia) (Graphics & Animation) with at least 50% marks (**) and with mathematics at 10+2 level OR iv. Any examination recognized by the Panjab University Chandigarh as equivalent to any of the above examination (i), (ii) or (iii)	
Ph.D.	Subject to availability	3-6 years	See M.Phil / Ph.D prospectus 2021	
**5% Concession is admissible in eligibility requirement to SC/ST/BC/PwD candidates. *for candidates who have studied Computer Science as one of the subjects for three years as a full course at the Under Graduate level.				

TITLE OF SYLLABI: Detailed Syllabi available at http://puchd.ac.in/syllabus.php

M.C.A.

SEMESTER - I		SEMESTER - II	
CS-78	Programming in C	CS-63	Data and File Structures(Using C)
CS-60	Computer Organization and Assembly Language	CS-64	Object Oriented Programming (Through C++ And Java)
CS-61	Data Base Management Systems	CS-48	Data Communication and Networks
CS-75	Mathematical Structures in Computer Science	CS-76	Computer Based Numerical and Statistical Methods
CS-56	Linux Operating System	CS-07	Accounting and Financial Management
		CS-81	MOOC
SEMESTER - III		**SEMESTER - IV**	
CS-65	Software Engineering	CS-79	Data Warehousing and Data Mining Techniques
CS-66	Operating Systems	CS-12	Interactive Computer Graphics
CS-67	Analysis and Design of Algorithms	CS-37	Theory of Computations
CS-77	ASP . NET Using C#	CS-71	Artificial Intelligence (Using LISP)
CS-69	Relational Data Base Management Systems	CS-72	Advanced Java and Network Programming
	SEMESTER - V		**SEMESTER – VI**
CS-17	Computer Based Optimization Techniques	CS-18	The Project period will be of 20 to 24 weeks duration. The Project will involve development of application/system software in industries, commercial or scientific environment. It will carry 400 marks.
CS-57	Software Project Management		
CS-58	Mobile Communication and Application Development		
CS-59	Soft Computing Techniques using Neural Networks		
CS-19	Seminar		

M. Sc. Computer Science under the framework of Honours School System

	SEMESTER - I		SEMESTER – II
MCS-1901	Software Engineering	MCS-1906	Advance Java and Network Programming
MCS-1902	Data Base Management System	MCS-1907	Artificial Intelligence (Using LISP)
MCS-1903	Operating Systems	MCS-1908	Interactive Computer Graphics
MCS-1904	Analysis and Design of Algorithms	MCS-1909	Data Warehousing and Data Mining Techniques
MCS-1905	Practical based on MCS-1902 and 1904	MCS-1910	Practical based on MCS-1906 and 1908
		MCS-1920	MOOC
	SEMESTER - III		**SEMESTER – IV**
MCS-1911	Soft Computing Techniques using Neural Networks	MCS-1917	Major Project (SRS, DFD, Database Design, Input/output Design, Coding, Testing & Deployment)
MCS-1912	Software Project Management	MCS-1918	Seminar (Based on MCS-1917)
MCS-1913	ASP.NET Using C#		
MCS-1914	Computer Based Optimization Techniques		
MCS-1915	Practical based on MCS-1911		
MCS-1916	Practical based on MCS-1913		

THRUST AREAS: Distributed Artificial Intelligence, Educational Technologies, Computer Graphics, Semantic Web Applications, Software Engineering, Open Source Software, Pattern Recognition, Image Processing and Computer Network / Security.

PLACEMENT: Campus placements of MCA and M. Sc. Computer Science under the framework of Honours School System students have been very good for the last many years evidencing that the MCA/ M. Sc. Computer Science under the framework of Honours School System Curriculum, teaching infrastructure and its environment have been of great importance to the students and highly relevant to the Industry. Various reputed computer companies such as Infosys, Nagarro, and Emerson etc visit the department on a regular basis for placement and more than 80% students get placed in these companies, thereby helping in development of Human Resource in the field of ICT.

ALUMNI RELATIONS: A large number of our Alumni are holding key positions in industry, commerce and public life in India as well as abroad.

DEPARTMENT OF ENVIRONMENT STUDIES

ABOUT THE DEPARTMENT

In addition to teaching, research on current environmental issues of local, national and global importance remains the major thrust areas of the Department of Environment Studies. The department also undertakes consultancy on environmental related issues through the University. The research conducted by the department has been credited with various national and international awards. The department also serves as the nucleus for co-ordination and implementation of compulsory course on Environment Education for Under Graduate classes of Panjab University and its affiliated colleges. The department has suitably developed the laboratory facilities with many sophisticated analytical equipment's including UV-VIS Spectrophotometer, HPLC (High Performance Liquid Chromatography) Flame Photometer, COD-BOD assembly for teaching, demonstration and research purposes. The department has a well-equipped a Library with latest books and reading material in the field of Environment. The classrooms are equipped with LED Projector for teaching and imparting instructions to the students. Students are encouraged to use these aids for their seminars/project presentations. The students are regularly exposed to various aspects of industry requiring environmental attention, along with educational trips to the related production units and research institutions.

FACULTY

Designation	Name	Field of Research Specialization
Professor	Harminder Pal Singh	Biotic Environment
Associate Professor	Suman Mor **(Chairperson)**	Environment, Sanitation, Health
Assistant Professors	Madhuri Rishi	Geo Environment
	Rajeev Kumar	Physical Environment

COURSES OFFERED (SEMESTER SYSTEM)

Course	Seats	Duration	Eligibility*	Admission Criteria
M.Sc.	20+3 NRI + 1 Foreign National	2 Year	Bachelor's Degree with minimum 50% marks in aggregate from any Science/ Engineering Stream or any other stream with Honours in Geography as one of the subjects from P.U. or any other recognised University.	Based on PUCET (PG) Academics: 50% P.U.CET (PG):50%
Ph.D	Subject to availability	3-6 Years	See M. Phil/ Ph.D. prospectus 2021	
*5% concession is admissible in eligibility marks to SC/ST/BC/PWD Candidates				

TITLE OF SYLLABI: Detailed syllabi available at http://puchd.ac.in/syllabus.php

M.Sc.

Semester -I			Semester -II		
Paper-1	ENV-6101	Environment Geoscience	**Paper-1**	ENV-6201	Biodiversity and Conservation
Paper-2	ENV-6102	Ecological Principals	**Paper-2**	ENV-6202	Environmental Analysis: Techniques and Instrumentation
Paper-3	ENV-6103	Environmental chemistry& Toxicology	**Paper-3**	ENV-6203	Environmental Pollution
Paper-4	ENV-6104	Solid waste management and techniques	**Paper-4**	ENV-6204	Environment Awareness, Impact Assessment and Auditing
Semester -III			**Semester -IV**		
Paper-1	ENV-6301	Environmental Technology	**Paper-1**	ENV-6401	Statistical applications and Research Methodology
Paper-2	ENV-6302	Major Environmental Issues	**Paper-2**	ENV-6402	Environmental Biotechnology
Paper-3	ENV-6303	Environment and Energy Management	**Paper-3**	ENV-6403	Remote Sensing and GIS in Environmental Studies
Paper-4	ENV-6304	Industrial and Biomedical Waste Management	**Paper-4**	ENV-6404	Training of at least 4-6 weeks, project report presentation

THRUST AREAS: Environment Pollution Monitoring & Remediation; Assessment of Biodiversity with special reference to Invasive Plants; Bio-prospecting of Medical and Aromatic Plants; Evaluation of Natural Plant Products as Novel Agrochemicals;

Eco-toxicological Impacts of Heavy metals; Rain Water Harvesting and Groundwater Pollution; Management of Solid Waste; Wastewater treatment.

PLACEMENTS: The pass outs from the department are well placed in various Educational / Research Institutions and Industrial Establishments.

ALUMNI RELATIONS: The department has recently constituted an association of the alumni. The department envisages holding at least one Alumni meet every year so as to strengthen the linkage and bondage of the Alumni and the Department

DEPARTMENT OF GEOLOGY AND CENTRE OF ADVANCED STUDY IN GEOLOGY (COSIST DEPARTMENT)

ABOUT THE DEPARTMENT

Established in 1958 by Late M.R. Sahni, the department was upgraded to the status of Centre of Advanced Study in 1963-64 in Himalayan Geology and Palaeontology. In 1986, it received COSIST Grants for improvement in infrastructure facilities in the Thrust areas of Geochemistry and Exploration Geology. In recent years of research and teaching besides Palaeontology, Petrology, Environmental Geology and Hydrogeology were included as additional thrust areas. The Department has been allocated Rs.90.00 lacs under the FIST Programme of the DST in 2003. In 2012, the department has received Rs.148.00 lacs under CAS (Phase-VII) scheme of the UGC. It is thus the oldest Advanced Centre in the Country under the Special Assistance Programme of the UGC. The Department has a large collection of fossils, rocks and minerals housed in its Museum. The department has 48 (Forty eight)(registered/enrolled)research students on its rolls.

FACULTY

Designation	Name	Field of Research Specialization
Honorary Professor	O.N. Bhargava	Himalayan Geology
Professors Emeritus	Ashok Sahni	Vertebrate Palaeontology & Biomineralisation
	S.B. Bhatia	Micro Palaeontology
Professors	Naval Kishore	Hydrogeology, Petrology & Environmental Geology
	Rajeev Patnaik **(Chairperson)**	Vertebrate Palaeontology
	Naveen Chaudhri	Igneous Petrology & Isotope Geochemistry
Associate Professors	Ashu Khosla	Palaeontology, Vertebrate, Micropalaeontology, Sedimentology & Palaeobiogeography
	Parampreet Kaur	Petrology, Isotope Geochemistry & Geochronology
Assistant Professors	Gurmeet Kaur	Petrology, Mineralogy, Geochemistry & Hydrogeo Chemistry
	B.P. Singh	Palaeontology & Stratigraphy
	Seema Singh	Sedimentology & Applied Geology
	Mahesh Thakur	Geophysics
	Debabrata Das	Groundwater Hydrology
UGC Assistant Professor	Susanta Paikaray	Environmental Geochemistry

COURSES OFFERED (SEMESTER SYSTEM)

Course	Seats	Duration	Eligibility*	Admission Criteria
B.Sc. (Hons.) under the framework of Honours School System	30+4 NRI + 2 Foreign National	3 Years	Candidate should have passed 10+2 examination with at least 50% marks with English, Physics, Chemistry, Maths / Biology.	Admission based on PUCET (UG) Academics : 25% P.U.CET(UG) : 75%
M.Sc. (Hons.) under the framework of Honours School System	30+4 NRI+ 2 Foreign National	2 Years	For vacant seats, B.Sc. 3 years course with Geology as one of the subjects 50% marks in B.Sc. & 50% marks in subject of Geology in B.Sc.	B.Sc. (Hons.) students of Geology, P.U., For vacant seats P.U. CET (PG). Academics : 40% P.U. CET (PG) : 60%
Ph.D.	Subject to availability	3-6 Years	See M.Phil/Ph.D Prospectus 2021	
*5% Concession is admissible in eligibility marks to SC/ST/BC/PwD candidates				

TITLE OF SYLLABI : Detailed syllabi available at http://puchd.ac.in/syllabus.php

B.Sc. (Hons.)

SEMESTER-I	SEMESTER-II
Theory Papers: Core Course(C)	**Theory Papers:** Core Course (C)
Th.I: Earth System Science	Th.I: Elements of Geochemistry
Th.II: Mineral Science	Th.II: Structural Geology
Practicals: Core Course(C)	**Practicals:** Core Course (C)
Pr.I: Earth System Science	Pr.I: Elements of Geochemistry
Pr.II: Mineral Science	Pr.II: Structural Geology
Theory Papers: Generic Elective(GE)	**Theory Papers:** Generic Elective(GE)
Th.I: Essentials of Geology	Th.I: Minerals and Rocks

Practicals: Generic Elective (GE)	**Practicals:** Generic Elective (GE)
Pr.I: Essentials of Geology	Pr.I: Minerals and Rocks
SEMESTER-III	**SEMESTER-IV**
Theory Papers: Core Course (C) & Skill Enhancement Course (SEC)	**Theory Papers:** Core Course (C) & Skill Enhancement Course(SEC)
Th.I: Igneous Petrology	Th.I: Metamorphic Petrology
Th.II: Sedimentary Petrology	Th.II: Stratigraphic Principles &Indian stratigraphy
Th.III: Palaeontology	Th.III: Hydrogeology
Practicals: Core Course (C) & Skill Enhancement Course(SEC)	**Practicals:** Core Course (C) & Skill Enhancement Course (SEC)
Pr.I: Igneous Petrology	Pr.I: Metamorphic Petrology
Pr.II: Sedimentary Petrology	Pr.II: Stratigraphic Principles &Indian stratigraphy
Pr.III: Palaeontology	P.III: Hydrogeology
SEI: 1	**SEI: 2**
Core Course (C) & Skill Enhancement Course (SEC1) Field Geology-1 / course work introduced UNDER RUSA	Core Course (C) & Skill Enhancement Course (SEC2) Field Geology 2/3/4/5 course work introduced UNDER RUSA
SEMESTER-V	**SEMESTER-VI**
Theory Papers: Core Course (C)	**Theory Papers:** Core Course (C)
Th.I: Economic Geology	Th. I: Engineering Geology
Th.II: Geomorphology	Th.II: Remote Sensing & GIS
Practicals: Core Course (C)	**Practicals:** Core Course (C)
Th.I: Economic Geology	Pr. I: Engineering Geology
Th.II: Geomorphology	Pr.II: Remote Sensing & GIS
Theory Papers: Discipline Specific Elective (DSE)	**Theory Papers:** Discipline Specific Elective (DSE)
Th.I: Geophysics	Th. I: Evolution of Life Through Time
Th.II: Earth's Climate and Environment	Th. II: Fuel Geology
Practicals: Discipline Specific Elective (DSE)	**Practicals:** Discipline Specific Elective (DSE)
Th.I: Geophysics	Pr. I: Evolution of Life Through Time
Th.II: Earth's Climate and Environment	Pr. II: Fuel Geology

B.Sc. (Hons.) III & IV Semester Generic Elective (GE) in Geology (Theory & Practical)

SEMESTER-III		SEMESTER-IV	
Th.I:	Ground Water	Th. I:	Stratigraphy
Pr.I:	Ground Water	Pr. I:	Stratigraphy

M.Sc

SEMESTER-I		SEMESTER-II	
Theory Papers : Core Course (CM)		**Theory Papers : Core Course (CM)**	
Th.I	Micropalaeontology	Th.I	Vertebrate Diversity & Evolution
Th.II	Neotectonics & Earthquakes	Th.II	Sedimentology
Th.III	Isotope Geochemistry	Th.III	Chemical Petrology & Crustal Evolution
Practicals Papers : Core Course (CM)		**Practicals Papers : Core Course (CM)**	
Pr.I	Micropalaeontology	Pr. I	Vertebrate Diversity & Evolution
Pr.II	Neotectonics & Earthquakes	Pr. II	Sedimentology
Pr.III	Isotope Geochemistry	Pr. III	Chemical Petrology & Crustal Evolution
Skill Enhancement Course (SECM1)		**Skill Enhancement Course (SECM2)**	
Geological Field Work /course work introduced UNDER RUSA		Geological Field Report & Viva Voce/course work introduced UNDER RUSA	
SEMESTER-III		**SEMESTER-IV**	
Theory papers : Core Course (CM)		**Theory Papers: Core Course (CM)**	
Th.I:	Mineral Resources & Mineral Economics	Th.I:	Environmental Geology
Th.II:	Petroleum Geology	Th. II:	Advanced Groundwater Hydrology
Th.III:	Exploration Geology		
Practical Papers: Core Course (CM)		**Practical papers: Core Course (CM)**	
Pr. I:	Mineral Resources & Mineral Economics	Pr. I:	Environmental Geology
Pr. II:	Petroleum Geology	Pr. II:	Advanced Groundwater Hydrology
Pr. III:	Exploration Geology		
Discipline Specific Elective (DSEM)		**Discipline Specific Elective (DSEM)**	
Project Oriented Geological Field Work / Assignment based project work		Project Oriented Field Report / Assignment based project work	

THRUST AREAS: Paleontology & Stratigraphy, Petrology, Hydrogeology & Environmental Geology.

PLACEMENTS: There is a Placement Cell in the department, which co-ordinates with the Central Placement Cell of the University and provides guidance and counseling to the students about the job opportunities in various Companies / Institutes.

ALUMNI RELATIONS: Alumni Association of the Department (PUGAA) often interacts and hold functions/webinars for the welfare and fulfillment of the aspirations of the alumni.

INSITUTE OF FORENSIC SCIENCE & CRIMINIOLOGY

ABOUT THE INSTITUTE

The Institute of Forensic Science & Criminology (IFSC) was established by Panjab University in 2009 for excellence in teaching and research in the field of Forensic Science & Criminology. Forensic Science & Criminology is a multi-disciplinary subject that has enormous applications in diverse areas like Law enforcement, Judiciary, Customs, and Defense, etc. The Institute is unique that it provides training in all aspects related to Forensic Science & Criminology with specialization in Forensic Biology, Forensic Chemistry and Forensic Physics. Institute is running its course under choice based credit system.

FACULTY

Designation	Name	Field of Research Specialization
Assistant Professors	Vishal Sharma **(Chairperson)**	Analytical Chemistry, material Science, Fingermark sensing, Chemometrics, Sensors for Forensic applications, Questioned Documents
	Shweta Sharma	Colloidal Chemistry, Forensic Toxicology, Drug-Drug Interaction
	Jagdish Rai	DNA Sequencing, Protein Science

COURSES OFFERED (SEMESTER SYSTEM)

Course	Seats	Duration	Eligibility*	Admission criteria
M.Sc	19 + 2NRI+1 ** + 1 Foreign National	2 years	B.Sc /B.Sc (Hons) degree in Forensic Science or any other Graduation Degree with 3/4/5 year duration with minimum 50% marks in the faculty of Science/ Engineering/ Medical / Dental and Pharmaceutical Science of Panjab University or any other University recognized University.	Based on PU-CET (PG): Academics: 50% PU-CET (PG):50%
Ph.D	Subject to availability	3-6 years	See Ph.D/M.Phil Prospectus 2021	

* 5% Concession is admissible in eligibility marks to SC/ST/BC/Pw D Candidates
**Seats reserved for in–service candidates from Government Organization. In case of non – availability of in–service candidate, the seat will be converted into General Category.

TITLES OF SYLLABI: Detailed syllabus available at://http://puchd.ac.in/syllabus.php

M.Sc.

Semester-I	Semester-II
i) General Forensic and Fingerprint Science ii) Forensic Biology iii) Instrumentation iv) Criminology, Criminal Law and Forensic Psychology v) Crime file/Scrap File	i) Molecular Biology and Biochemistry ii) Forensic Chemistry iii) Forensic Physics iv) Quality Management and Statistics v) Seminar/Journal Club
Semester-III	**Semester-IV**
i) Forensic Toxicology and Drugs of Abuse ii) Ballistics iii) Forensic Genomics & Application iv) Forensic Anthropology, Osteology and Odontology v) Thesis work Part-I vi) Statistics	i) Questioned Documents ii) Computer Forensics iii) Forensic Audio-Video Analysis iv) Forensic Explosives v) DNA and Protein Methods vi) Thesis work –Part II

THRUST AREAS: Fingerprint detection using nanoparticles, Analytical techniques for Questioned Document examination, Forensic Toxicology, Extraction of questioned analyte, Drug-drug interactions, Developing drug sensors, Forensic Anthropology and Forensic Biology.

PLACEMENTS: The placement cell of the department endeavors to offer placement services to the students. The students are informed of various opportunities. The students are placed mainly in the state and national government organizations.

ALUMNI RELATIONS: The department remains in touch with old students by inviting them in get-togethers/Annual Functions where they share their experience.

DEPARTMENT OF MATHEMATICS
(CENTRE FOR ADVNACED STUDY IN MATHEMATICS)

ABOUT THE DEPARTMENT

The Department was established in 1952 at Hoshiarpur and set up at Chandigarh in 1958. It is one of the best departments of Mathematics of the Indian Universities. It has been recognized as Centre for Advanced Study in Mathematics since 1963 by the U.G.C. TheNational Board for Higher Mathematics has granted the status of Regional Library to the Library of the Department and support the consortium for the online access to Math. Sci. Net, for which the department is the leading partner.

FACULTY

Designation	Name	Field of Research Specialization
Professors Emeritus	R.P. Bambah	Number Theory, Geometry of Numbers, Discrete Geometry
	I.B.S.Passi	Algebra

	R.J. Hans Gill	Number Theory, Geometry of Numbers, Discrete Geometry
	S.K. Khanduja	Algebraic Number Theory
	A.K. Aggarwal	Number Theory
Professor (CSIR Emeritus)	Madhu Raka	Number Theory, Geometry of Numbers, Algebraic Coding Theory
Professors	S.K. Tomar	Applied Mathematics, Continuum Mechanics
	Savita Bhatnagar	Harmonic Analysis, Real Analysis
	Renu Bajaj	Applied Mathematics, Fluid Dynamics
	Vanita Verma	Operational Research Optimization
	Gurmeet Kaur Bakshi	Algebra, Algebric Coding Theory
	Dinesh K. Khurana **(Chairperson)**	Algebra, Ring Theory
Associate Professors	Vikas Bist	Algebra & Analysis, Linear Algebra
	Poonam Sehgal	Algebra, Number Theory & Complex Analysis
Assistant Professors	Suman Bala	Continuum Mechanics
	Manisha Sharma	Operational Research
	Anjana Khurana	Algebra
	Sarita Pippal	Computational Fluid Dynamics
	Surinder Pal Singh	Real Analysis, Graph Theory
	Aarti Khurana	Continuum Mechanics
Assistant Professors (UGC)	Dilbag Singh	Applied Mathematics, Continuum Mechanics
	Gagandeep Singh	Queuing Theory, Stochastic Modeling, Applied Probability

COURSES OFFERED (SEMESTER SYSTEM)

Course	Seats	Duration	Eligibility*	Admission Criteria
B.Sc. (Hons.) Mathematics under the framework of Honours School System	30+3NRI + 2 Foreign National	3 years	50% marks in 10+2 examination from a recognizedBoard / CBSE with Mathematics as one of the subjects.	Based on PU CET (UG) Academics : 25% PU CET (UG) : 75%
B.Sc. (Hons.) Mathematics & Computing under the framework of Honours School System	15+2NRI + 1 Foreign National	3 years	50% marks in 10+2 examination from a recognizedBoard / CBSE with Mathematics as one of the subjects.	Based on PU CET (UG) Academics : 25% PU CET (UG) : 75%
M.Sc. Mathematics under the framework of Honours School System	40+5 NRI + 2 Foreign National	2 years	B.Sc. (Hons.) in Mathematics and B.Sc. (HS) in Maths and Computing from the department of Mathematics, PU Chandigarh	Ongoing class
	30+5 NRI +2 Foreign National	2 years	BA / B.Sc. (General) with 50% marks in Mathematics as a major subject OR BA /B.Sc. with Hons. 50% marks in Mathematics of PU or any other University recognized by PU as equivalent thereto OR B.Sc. (Hons.) in any subject under CBCS with 24 credits in Mathematics as Generic Elective subject	Based on PU CET (PG) Academics : 40% PU CET (PG) : 60%
Ph.D.	Subject to availability	3-6 Years	See M.Phil/Ph.D Prospectus 2021	

*5% Concession is admissible in eligibility marks to SC/ST/BC/PwD candidates
INMO awardees can join B.Sc. (Hons.) Department of Mathematics, without appearing in the PU CET (UG) Entrance Test.

TITLE OF SYLLABI: Detailed Course Curriculum is available at www.puchd.ac.in

B.Sc. (Hons.) Mathematics under CBCS

SEMESTER-I		SEMESTER-II	
C1	MAT-C1: Calculus	C3	MAT-C3: Real Analysis
C2	MAT-C2 : Algebra	C4	MAT-C4: Differential Equations
MAT-AECC1	English / MIL	MAT-AECC2	English / MIL
AECC1	Communications / Environment Science	AECC2	Communications / Environment Science
GE1*	MAT - GE1	GE2*	MAT – GE3
	MAT - GE2		MAT – GE4
SEMESTER-III		**SEMESTER-IV**	
MAT-C5	Theory of Real Functions	MAT-C8	Numerical methods
MAT-C6	Group Theory I	MAT-C9	Reimann Integration and Series of Functions
MAT-C7	PDE and system of ODE	MAT-C10	Ring Theory and Linear Algebra 1
SEC1		SEC2	

GE3*	MAT-GE5	GE4*	MAT-GE6
SEMESTER-V		**SEMESTER-VI**	
C11	MAT-C11-Multivariale Calculus	C13	MAT-C13-Metric Spaces & Complex Analysis
C12	MAT-C12- Group Theory-II	C14	MAT-C14- Ring Theory and Liner Algebra II
DSE1		DSE3	
DSE2		DSE4	

C: Core courses; GE: General Elective; AECC: Ability Enhancement Compulsory Courses; SEC: Skill Enhancement Courses; DSE; Discipline Specific Elective
*GE subjects are to be selected by the students from the pool of GE subjects offered by various Departments of the University.

B.Sc. (Hons.) Mathematics & Computing under CBCS Course Structure with Credit Details

SEMESTER – I (26 Credits)							
Code	**Name of Course**	**Theory / Practical**	**Core**	**GE**	**DSE**	**SEC**	**AECC**
MATC-C1	Calculus	T+P	4+2				
MATC-C2	Algebra	T	6				
MATC-C3	Fundamentals of Computers and Fortran - 90	T+P	4+2				
MATC-AECC1							2
MATC-GE1				6			
SEMESTER – II (26 Credits)							
Code	**Name of Course**	**Theory / Practical**	**Core**	**GE**	**DSE**	**SEC**	**AECC**
MATC-C4	Real Analysis	T	6				
MATC-C5	Differential Equations	T+P	4+2				
MATC-C6	Programming with C	T+P	4+2				
MATC-AECC2							2
MATC-GE2				6			
SEMESTER – III (30 Credits)							
Code	**Name of Course**	**Theory / Practical**	**Core**	**GE**	**DSE**	**SEC**	**AECC**
MATC-C7	Group Theory I	T	6				
MATC-C8	Data and File Structures	T+P	4+2				
MATC-C9	Theory of Real Functions	T	6				
MATC-SEC1						6	
MATC-GE3				6			
SEMESTER – IV (30 Credits)							
Code	**Name of Course**	**Theory / Practical**	**Core**	**GE**	**DSE**	**SEC**	**AECC**
MATC-C10	Ring Theory and Linear Algebra I	T	6				
MATC-C11	Programming with Python	T+P	4+2				
MATC-C12	Riemann Integration and series of Functions	T	6				
MATC-SEC2						6	
MATC-GE4				6			
SEMESTER – V (24 Credits)							
Code	**Name of Course**	**Theory / Practical**	**Core**	**GE**	**DSE**	**SEC**	**AECC**
MATC-C13	Probability and Statistics	T	6				
MATC-C14	Artificial Intelligence	T	6				
MATC-DSE1*	Group Theory II	T			6		
MATC-DSE2					6		
SEMESTER – VI (20 Credits)							
Code	**Name of Course**	**Theory / Practical**	**Core**	**GE**	**DSE**	**SEC**	**AECC**
MATC-C15	Data Analytics Using R	T+P	4+2				
MATC-C16	Numerical Optimization	T	6				
MATC-DSE3*	Ring Theory and Linear Algebra II	T			6		
MATC-DSE4	Research Project				2		

Total Credits for B.Sc. (Honours) Mathematics and Computing will be 156 credits
(Core: 96 credits, GE: 24 credits, DSE: 20 credits, SEC: 12 credits, AECC: 4 credits)

Nature of Courses

S.No.	Name	Semester	Remarks
1.	Core Courses (C) (MATC-C1 to MATC-C16)	I, II, III, IV, V, and VI	Each student of B.Sc. (Honours) Mathematics and Computing will be offered sixteen core courses (6 credits) over six semesters.

2.	Ability Enhancement Compulsory Course (AECC) (MATC-AECC1 to MATC-AECC2)	I and II	Each student of B.Sc. (Honours) Mathematics and Computing has to opt one AECC course in Semester - I and II out of the following: 1. English Communication (2 credits) 2. Environmental Science (2 credits)
3.	Generic Elective Courses (GE) (MATC-GE1 to MATC-GE4)	I, II, III, and IV	Each student of B.Sc. (Honours) Mathematics and Computing has to opt any one GE course (6 credit) offered by the other Departments of Panjab University for Semester I to IV.
4.	Skill Enhancement Courses (SEC) (MATC-SEC1 to MATC-SEC2)	III and IV	MATC-SEC1: Each student of B.Sc. (Honours) Mathematics and Computing has to opt any one SEC course (6 credit) out of the following. 1. PDE and system of ODE (P) (6 credit) 2. Discrete Mathematics (6 credit) MATC-SEC2: Each student of B.Sc. (Honours) Mathematics and Computing has to opt for the course: Numerical Methods (P) (6 credit).
5.	Discipline Specific Elective Courses* (DSE*) (MATC-DES1* and MATC-DES3*)	V and VI	MATC-DSE1*: Each student of B.Sc. (Honours) Mathematics and Computing has to opt for the course: Group Theory II (6 credit). MATC-DSE3*: Each student of B.Sc. (Honours) Mathematics and Computing has to opt for the course: Ring Theory and Linear Algebra II (6 credit).
6.	Discipline Specific Elective Courses (DSE) (MATC-DES2 and MATC-DES4)	V and VI	MATC-DSE2: Each student of B.Sc. (Honours) Mathematics and Computing has to opt any one DSE course out of the following. 1. Multivariate Calculus (6 credit). 2. Number Theory (6 credit). MATC-DSE4: Each student of B.Sc. (Honours) Mathematics and Computing will be given a Research Project (RP), either individually or in a group of 2-3 students. This research project will be of 2 credits.

M.Sc (Hons.) under CBCS			
SEMESTER-I		**SEMESTER-II**	
Every student will have to take five papers given below:			
Core Course-I	MAT MC1-Field Theory & Commutative Algebra-I OR MAT MC2-Groups and Rings	Core Course-VI	MAT MC9-Commutative Algebra-II ORMAT MC10-Modules & Fields
Core Course-II	MAT MC3-Topology OR MAT MC4-Real Analysis	Core Course-VII	MAT MC11–Number Theory-I OR MAT MC12–Number Theory-II
Core Course-III	MAT MC5-Advanced Complex Analysis OR MAT MC6-Complex Analysis-I	Core Course-VIII	MAT MC13-Lebesgue Integration
Core Course-IV	MAT MC7-Linear Programming	Core Course-IX	MAT MC14-Ordinary Differential Equations
Core Course-V	MAT MC8-Classical Mechanics	Core Course-X	MAT MC15 - Probability Theory and Random Processes
The above mentioned courses will be offered to the students depending upon their background.			
The students who have studied MAT MC1 in Semester I will have to take MAT MC9 in Semester II. Similarly, the students who have studied MAT MC2 in Semester I will have to take MAT MC10 in Semester II. MAT MC 12 will be offered to those students who have studied its prerequisites in bachelor's degree			
SEMESTER-III		**SEMESTER-IV**	
Core Course XI	MAT MC16-Non-Commutative Ring Theory OR MAT MC17-Linear Algebra and Commutative Algebra-I	Core Course XIV	MAT MC21-Representation Theory of FiniteGroups OR MAT MC22-Commutative Algebra-II
Core Course XII	MAT MC18-General Measure Theory OR MAT MC19–Topology	Core Course XV	MAT MC23-Functional Analysis
Core Course XIII	MAT MC20-Partial Differential Equations		
The students who have studied MAT MC1 and MAT MC9 in Semesters I & II will have to take MAT MC16 & MAT MC18 in Semester III. Similarly, the students who have studied MAT MC2 and MAT MC10 in Semesters I & II will have to take MAT MC17 & MAT MC19 in Semester III		The students who have studied MAT MC16 in Semesters III will have to take MAT MC 21 in Semester IV. Similarly, the students who have studied MAT MC17 in Semesters III will have to take MAT MC22 in Semester IV.	
Discipline Specific Elective Courses (Students have to choose one or two out of following depending upon their background)		Discipline Specific Elective Courses (Students have to choose two or three out of following depending upon their background)	
MAT MDSE 1	Computational Techniques-I	MAT MDSE 1*	Computational Techniques-I
MAT MDSE 2	Algebraic Number Theory-I	MAT MDSE 2*	Algebraic Number Theory-I
MAT MDSE 3	Algebraic Coding Theory-I	MAT MDSE 3*	Algebraic Coding Theory-I

MAT MDSE 4	Complex Analysis-II	MAT MDSE 4*	Complex Analysis-II
MAT MDSE 5	Fluid Mechanics-I	MAT MDSE 5*	Fluid Mechanics-I
MAT MDSE 6	Non Linear Programming	MAT MDSE 6*	Non Linear Programming
MAT MDSE 7	Mathematical Statistics	MAT MDSE 7*	Mathematical Statistics
MAT MDSE 8	Mechanics of Solids-I	MAT MDSE 8*	Mechanics of Solids-I
MAT MDSE 9	Numerical Methods for DifferentialEquations	MAT MDSE 9*	Numerical Methods for Differential Equations
		MAT MDSE 10	Computational Techniques II
		MAT MDSE 11	Algebraic Number Theory-I
		MAT MDSE 12	Algebraic Coding Theory-II
		MAT MDSE 13	Fluid Mechanics-II
		MAT MDSE 14	Mechanics of Solids II
		MAT MDSE 15	Partial Differential Equations II
		MAT MDSE 16	Numerical Methods for differential Equations-II
			*Will Be Offered If Not Run In Semester-III
SKILL ENHANCEMENT COURSES		**SKILL ENHANCEMENT COURSES**	
If a student has opted for only one Discipline specific elective course, then he/she may choose one of the following (depending upon the background)		If a student has opted for only one Discipline specific elective course, then he/she may choose one of the following (depending upon the background)	
MAT MSEC 1	Stochastic calculus	MAT MSEC 1*	Stochastic calculus
MAT MSEC 2	Network Analysis	MAT MSEC 2*	Network Analysis
			* Will if offered if not run in Semester III
GENERIC ELECTIVE COURSES		**GENERIC ELECTIVE COURSES**	
If a student has opted for only one Discipline Specific Elective Course and no Skill Enhancement course, then he / she may choose one of the course offered by the following Departments of Panjab University at Masters level (depending upon the background)		If a student has opted for only two Discipline Specific Elective Course and no Skill Enhancement course, then he / she may chooseone of the course offered by the following Departments of Panjab University at Masters level (depending upon the background)	
(i)	Physics	(i)	Physics
(ii)	Computer Science	(ii)	Computer Science
(iii)	Statistics	(iii)	Statistics
(iv)	Economics	(iv)	Economics

THRUST AREA: Algebra, Continuum Mechanics, Analysis, Optimization.

PLACEMENTS: Our students are placed in teaching jobs in Government/private educational institutions.

ALUMNI RELATIONS: We invite our distinguished alumni at every academic function in the department. They deliver motivating lectures to the students / faculty.

DEPARTMENT OF MICROBIOLOGY

ABOUT THE DEPARTMENT

The department is one of the oldest and pioneer departments of Microbiology. The department has made a remarkable progress in teaching and research since its establishment and has been recognized for research Nationally and Internationally. It has been implementing various schemes and R & D Projects by various govt. agencies like department of Biotechnology (DBT), Dept. of Science and Technology (DST-PURSE, University Grants Commission), other Funding Agencies including Council of Scientific and Industrial Research (CSIR), Indian Council for Medical Research (ICMR), Chandigarh Council of Science and Technology (CCST) etc.

Research facilities

The Department has excelled in Medical and Industrial Research and owes the faculty with expertise in almost all the branches of Microbiology like Immunology, Diagnostic Reproductive Biology, Phage Therapy, Microbial Biosensors, Quorum Sensing, Molecular Biology, Food Microbiology, Fermentation Technology, Microbial Diversity and Metabolites, Environmental Microbiology, Enzymes and their Applications etc. The graduates from this department are already employed in various National/International academic, premier research and industrial organizations and International Universities. The department has good modern teaching and research infrastructure.

Collaborations

Besides intradepartmental collaborations, the department does have collaborations with PGIMER (CHD), CSIR-IMTECH (CHD), PEC(CHD), CSIR-IHBT (Palampur). The faculty of the department has been conferred awards/recognition at various platforms nationally. The vision of the department is to explore Microbial diversity in Health, Industry and Environment with the mission to use Microbiology in the Service of Society.

Major research facilities available in the department

In 2014, the department has shifted to new building in South Campus of the university situated in Sector-25, Chandigarh. The new building has the world class infrastructure and well established departmental Instrumentation Facility. The major equipment available in the department include UV-Visible Spectrophotometers, Ultra Centrifuge, Refrigerated Centrifuge, Ultra Deep Freezer, Orbital Shakers, Water Bath Shakers, Protein Purification System with fraction collector, electrophoresis equipment, BOD Incubators, Gas chromatograph, laboratory fermenter, Fluroscent Microscope, Sonicator, Trans-illuminator,

CO_2 incubators, Micro Centrifuge, Cold Room, Real Time PCR Machine, Electro-evaporator, ELISA Reader, Lyophilizer, Milipore Water Purification System etc. The Department of Biotechnology, Govt. of India, New Delhi has selected this department for assistance for enhancement of research and teaching in the field of Microbial Biotechnology. UGC has selected the department for Special Assistance Programme (SAP).

FACULTY

Particular	Name	Field of Research Specialization
Professor Emeritus	K. G. Gupta	Applied Microbiology
	J. K. Gupta	Industrial Microbiology
Scientist Emeritus	Sanjay Chhibber	Medical Microbiology
Professors	Prince Sharma	Molecular Microbiology
	Vijay Prabha	Medical Microbiology
	Praveen Rishi	Medical Molecular Microbiology
	Sanjiv Kumar Soni	Food and Fermentation Technology
	Kusum Harjai	Applied Medical Microbiology & Immunology
	Geeta Shukla	Medical Microbiology
Assistant Professors	Deepak Kumar Rahi **(Chairperson)**	Industrial Microbiology
	Naveen Gupta	Industrial & Molecular Microbiology
	Khem Raj	Medical Microbiology
	Seema Kumari	Virology

COURSES OFFERED (SEMESTER SYSTEM)

Course	Seats	Duration	Eligibility*	Admission criteria
B. Sc. (Hons.) under the framework of Honours School System	30 + 4NRI + 2 Foreign National	3 years	50% marks in 10+2 with English, Physics, Chemistry, Maths, Biology, Biotechnology	Admission based on P.U. CET-(U.G.) Academics: 25% PU-CET(UG):75%
M.Sc. Microbiology under the framework of Honours School System	30 + 4 NRI + 2 Foreign National	2 years	Ongoing students must have cleared B. Sc. (Hons.)	Ongoing Classes
Ph.D	Subject to availability	3-6 years	See M. Phil / Ph.D Prospectus 2021	
*5% Concession is admissible in eligibility marks to SC/ST/BC/PwD Candidates				

TITLES OF SYLLABI : Detailed syllabus available at www.puchd.ac.in/syllabus.php

COURSE STRUCTURE

B.Sc (Hons. under the framework of Honours School System)

SEMESTER-I		SEMESTER-II	
C1	MIC-C1: Biomolecules	C3	MIC-C3: General Microbiology
C2	MIC -C2: Cell Biology	C4	MIC-C4: Molecular Biology
AECC1	MIC-AECC1: English	AECC2	MIC-AECC2: Environmental Science
GE1*	General Bacteriology (To be offered for the students from other Departments)	GE3*	Environmental Microbiology (To be offered for the students from other Departments)
GE2*		GE4*	

Four core courses in first year will run simultaneously in both semesters under PU-IMBSER

SEMESTER-III		SEMESTER-IV	
C5	MIC-C5: General Bacteriology	C8	MIC-C8: Environmental Microbiology
C6	MIC-C6: Industrial Microbiology	C9	MIC-C9: Medical Microbiology
C7	MIC-C7: Microbial Physiology and Metabolism	C10	MIC-C10: Food and Dairy Microbiology
SEC1		SEC2	
GE5*	Industrial Microbiology (To be offered for the students from other Departments)	GE6*	Medical Microbiology (To be offered for the students from other Departments)

SEMESTER-V		SEMESTER-VI	
C11	MIC-C11: Medical Bacteriology	C13	MIC-C13: Molecular Genetics
C12	MIC-C12: Immunology	C14	MIC-C14: Virology
DSE1		DSE3	
DSE2		DSE4	

C: Core Courses; GE: General Elective; AECC: Ability Enhancement Compulsory Courses; SEC: Skill Enhancement Courses; DSE: Discipline Specific Elective

*: GE subjects are to be selected by the students from the pool of GE Subjects offered by various Departments of the University.

**SKILL ENHANCEMENT COURSES (any one per semester in semesters 3-4)	*DISCIPLINE SPECIFIC SUBJECTS (any two per semester in semesters 5-6)
MIC-SE1: Microbial Quality Control in Food and Pharmaceutical Industries MIC-SE2: Microbial Diagnosis in Health Clinics MIC-SE3: Biofertilizers and Biopesticides	MIC- DSE1: Microbial Biotechnology MIC- DSE2: General Pathology MIC- DSE3: Immunopathology

MIC-SE4: Food Fermentation Techniques MIC-SE5: Management of Human Microbial Diseases MIC-SE6: Microbiological Analysis of Air and Water	MIC- DSE4: Microbes in Sustainable Agriculture and Development MIC- DSE5: Biosafety and Intellectual Property Rights MIC- DSE6: Instrumentation and Biotechniques MIC- DSE7: Project Work-I (Medical stream) MIC-DSE8: Project Work-II (Non-Medical stream)

*Courses under these will be offered only if a minimum of 10 students opt for the same

M.Sc

SEMESTER I	SEMESTER II
MMIC C-1 Advances in Microbial Ecology	MMIC C-5 Fermentation Technology
MMIC C-2 Pathogenesis of Infectious diseases	MMIC C-6 Advances in Molecular Biology & Biotechnology
MMIC C-3 Newer approaches in diagnostic Microbiology	MMIC C-7 Advances in Immunoprophylaxis & Immunotherapy of Infections
MMIC C-4 Combined Practical-1	MMIC C-8 Combined Practical-2 MMIC GE-2 Swayam Paper-II*
MMIC GE-1 Swayam Paper-I*	
SEMESTER III	**SEMESTER IV**
MMIC C-9 IPR, Biosafety, Bioinformatics and Biostatistics	MMIC C-14 Journal Club
MMICC-10 Advanced Topics in Microbiology –I (Seminar)	MMIC C-15 Research Work (Thesis)**
MMIC C-11 Advanced Topics in Microbiology –II (Paper)	MMIC C-16 Research Work (Viva Voce)**
MMIC C-12 Project Training Report & Presentation MMIC C-13 Research Work (Review)**	
MMIC GE-3 Swayam Paper-III*	

* Generic Elective (GE) subjects are to be selected by the students from the following pool of subjects available on "Swayam", Free on line free education portal (https://swayam.gov.in/) as recommended by UGC. Courses delivered through SWAYAM are available free of cost to the learners, however students wanting certifications shall be registered, shall be offered a certificate on successful completion of the course, with a little fee. At the end of each course, there will be an assessment of the student through proctored examination and the marks/grades secured in this exam could be transferred to the academic record of the students. UGC has already issued the UGC (Credit Framework for online learning courses through SWAYAM) Regulation 2016 advising the Universities to identify courses where credits can be transferred on to the academic record of the students for courses done on SWAYAM.

1. Bioorganic and biophysical chemistry
2. Organic spectroscopy
3. Application of spectroscopic methods in molecular structure determination
4. Environmental chemistry
5. Forensic chemistry and explosives
6. Forensic biology and serology
7. Food laws and standards
8. Technology of fermented, cheese, ice-cream and by-products

****RESEARCH WORK:** The research work for thesis will start from third semester and will be continued in the fourth semester. The weight age will be of 50 marks in third semester. At the end of semester third, students will submit their literature work in the form of a Review on the topic selected. There will be a presentation before a panel of teachers from the department.

THRUST AREAS: Medical Microbiology, Food Microbiology, Industrial Microbiology, Immunology, Environmental Microbiology, Microbial Physiology and Biochemistry, Genetic Engineering and Biotechnology.

PLACEMENTS: Though there is 100% off campus placement of the students of Microbiology after M.Sc./Ph.D, efforts are being made to activate the process of on campus placement through Central Placement Cell, Panjab University, Chandigarh.

ALUMNI RELATIONS & Distinguished Alumni of Department: To promote the alumni relations, the committee has recently been constituted to activate the process.

DEPARTMENT-CUM-NATIONAL CENTRE FOR HUMAN GENOME STUDIES AND RESEARCH

ABOUT THE CENTRE

Department cum National Centre for Human Genome Studies and Research is relatively new education centre established in year 2002. The first sequencing of the human genome in 2002 provided a glimpse of humans at our most basic molecular level. The main goal of our department is to inspire and educate young minds in Genetics and Genomics. Students learn to approach problems and formulate questions that span the full range of biological systems, from genes to cells to medicine to evolution. Research in Genetics and Genomics is quickly becoming the key source of new insights, better understanding and targeted treatments of both rare monogenic diseases and common complex diseases such as coronary heart disease, cancer etc. Our ethos reflects and fosters a passion for discovery and curiosity and a commitment to excellence. The goal of this Centre is to provide the most advanced and comprehensive education possible related to human genome at the post graduate level. We highly value interdisciplinary knowledge and collaboration as the core of our effort. Our research addresses the molecular mechanisms underlying fundamental processes in biology and disease. We apply genetic, biochemical, cell biological, computational and biophysical approaches to study various questions/problems in biology. We are motivated towards understanding of human biology and disease and to develop solutions to societal health problems. Mission is to establish specific scientific programs that will be available to the public, to improve human health and well-being through education and research.

FACULTY

Designation	Name	Field of Research Specialization
Associate Professor	Ramandeep kaur **(Chairperson)**	Molecular and Cancer Biology
Assistant Professors	Shashi Chaudhary	Genetics & Molecular Biology of Human Disease
	Ranvir Singh	Protein Crystallography

COURSES OFFERED (SEMESTER SYSTEM)

Course	Seats	Duration	Eligibility*	Admission Criteria
M.Sc. Human Genomics	15+ 2 NRI + 1 Foreign National	2 years	B.Sc. (Pass or Honours) under 10+2+3 pattern of examination with at least 55% marks in Physical, Chemical, Biological, Pharmaceutical Science or in medicine from any University/ Institute recognized by P.U.	Based on P.U. CET-(P.G.) Academics: 50% P.U.CET(PG):50%
Ph.D.	Subject to availability	3-6 years	See M.Phil/Ph.D. Prospectus 2021	
*5% concession is admissible in eligibility marks to SC/ST/BC/PwD candidates				

TITLES OF SYLLABI (Detailed syllabus available at http://puchd.ac.in/syllabus.php)

M.Sc.

	Semester-I		Semester-II
MHG 101	Biochemistry and Cell Biology	MHG 201	Structure Biology & Bioinformatics-I
MHG 102	Molecular Biology	MHG 202	Immunology
MHG 103	Genetics	MHG 203	Human Molecular Genetics-I
MHG 104	Analytical Techniques	MHG 204	Genetic Engineering-Tools and Techniques
MHG 105	Practical based on 101 & 102	MHG 205	Practical based on 201 & 202
MHG 106	Practical based on 103 & 104	MHG 206	Practical based on 203 & 204
	Semester-III		**Semester-IV**
MHG 301	Structure Biology and Bioinformatics-II	MHG 401	Project Work and Presentation
MHG 302	Gene Expression and Epigenetics	MHG 402	Clinical Round & Viva
MHG 303	Human Molecular Genetics-II	MHG 403	Educational Tour & Journal Club
MHG 304	Genomics and Proteomics		
MHG 305	Practical based on 301 & 302		
MHG 306	Practical based on 303 & 304		

THRUST AREAS: Molecular Biology, Functional Genomics and Proteomics.

PLACEMENTS: Most of the students pursue Ph.D. programe after completion of their course while others opt for private sector jobs in clinical research organizations like Dr. REDDYS (Hyderabad), Quantum Solution etc.

ALUMNI RELATIONS: Departmental alumni keep visiting and interacting with students and provide their valuable input from their experience, time to time.

DEPARTMENT OF PHYSICS

ABOUT THE DEPARTMENT

The Department of Physics was established at Lahore in 1934, moved to Delhi for some time and then to Govt. College, Hoshiarpur (Punjab) after partition. Subsequently, the Department was shifted to Chandigarh in 1958.

The Department had previously received grants under the UGC- COSIP (College Science Improvement Programme) from 1977-83, SAP (Special Assistance Programme) from 1980-88 and COSIST (Committee of Strengthening of infrastructure in Science and Technology) from 1984-91. Since 1988, it has been accorded the status of a Centre of Advanced Study (CAS) by UGC with three major thrust areas: Particle Physics, Nuclear Physics and Solid-State Physics - a unique achievement. At present the Department has the strength of 22 faculty members, 2 UGC Faculty, 36 Assisting staff and 2 daily wage staff, apart from Post-doctoral fellows under various funding schemes as well as project scientists/investigators. There are about 108 research students and 437 B.Sc. (Hons. School) Physics, M.Sc. (Hons. School) Physics, B.Sc. (Hons. School) Physics (Specialization in Electronics) and M.Sc. (Hons. School) (Specialization in Electronics) students on the rolls of the Department. About 150 B.Sc. (Hons. School) students of other departments study Physics subjects as General Elective Courses.

The faculty members have been honoured with Meghnad Saha Award, Goyal Prize (Kurukshetra University), Sir C.V. Raman Award, Hari Om Trust Award, S.N. Satya Murthi Young Scientist Award, DAE Young Scientist Award, Himachal Scientists of the Year award 2011**,** Chinese Academy of Sciences President's International fellowship, Mercator Professorship, Homi Bhaba Fellowship, Emeritus Scientistships, Ramanna Fellowship, Raman Fellowship. They have been elected for Indian Academy of Sciences fellowship, Joliot Curie fellowship, Alexander Von Humboldt fellowships, DFG (German Research Society) Fellowship, BMFT (Ministry of Research and Technology of Germany like DST) fellows, UNESCO/IAEA Fellowship, WE-Heraeus Fellowship, Heinrich Hertz Foundation fellowship, Fulbright Fellowship, Commonwealth fellowship, IN2P3-CNRS Fellowship, France, Third World Academy of Sciences fellowships and UGC National Lecturer Fellowship awards. Our faculty had also served/ is serving at various administrative positions such as Vice-Chancellors of Panjab University and other universities.

The Department is having research collaborations with institutions like Royal Military College of Canada, Canada; University of Notre Dame, USA; Fermilab USA; CERN Geneva; Bonn University Germany; University of Bayreuth, Wuerzburg, Munich and

Berlin in Germany, Chemistry Deptt., City College of New York (CUNY), New York; KEK Japan, Chinese academy of Sciences, Shanghai China; ICTP, Trieste; Univ. of Illinois, USA; BNL, USA; Max. Planck Institute, Germany; Univ. of Leipzig, Germany; SUBATECH, Nantes, France; Instt. for Theoretische Physics, Tubingen, Germany; Instt of Nuclear Studies, Warsaw University, Poland; Univ. of Milano, Italy; J.L. Univ., Germany; J.W. Goethe Univ., Frankfurt, Germany; Instt. of Nucl. Physics, Strasbourg, France; University of Surrey, Gilford, U.K.; University of Hawaii, Cincinnati; Virginia Tech., Princeton University, University of Antwerp, Belgium, JINR Dubna Russia, IUC, Kolkata; VECC, Kolkata; TIFR, Mumbai; IAUC., New Delhi; IIT, Kanpur; Delhi University, Delhi; Mumbai University, Mumbai; IIT, Chennai; I.O.P. Bhubaneshwar; H.P. University, Shimla; T.B.R.L., P.G.I.M.E.R., C.S.I.O., Chandigarh, Jammu University, Jammu. The department has MOU with IUAC, New Delhi, for joint faculty appointment and to various academic exchange programs for Accelerator based research.

UGC had sanctioned 3 crores under CAS-V Phase **(2015-2020)** grant under improvement of Infrastructural facilities of the Physics department. Funds of Rs. 3.5 crores for infrastructure development have been sanctioned by the Department of Science and Technology under FIST programme to upgrade Teaching and Research facilities.

Research Facilities

Facilities exist in the Department for research in Nuclear Physics, High Energy Physics, Photon-Atom Interaction Studies, Solid State/Condensed Matter Physics, Laser Spectroscopy, Astrophysics and Planetary Science (Space Sciences), Radiometric Dating and Theoretical Physics, leading to the Ph.D. degree.

Major facilities available in the Department : (i) Cyclotron, (ii) High Energy Physics (Data Analysis and Detector fabrication Labs.) for studies connected with Collider Physics at CERN and Fermilab., Neutrino Physics at INO and Fermilab., (iii) Facilities for PAC/PAD studies of Hyperfine Interactions (iv) Semi-conductor laboratory, fabrication of thin films, (v) Raman Spectrometer, (vi) Several Nuclear Spectrometers incorporating detectors like HPGe, Si(Li), NaI(Tl), BaF_2, and $LaBr_3$ associated with modern electronics, (vii) Data Analysis labs. for Ultra relativistic heavy Ions experiments done at CERN, (viii) High Performance Computational Facility for theoretical studies for modeling physical problems including simulations, (ix) Energy dispersive X-ray fluorescence spectrometers using radioactive exciter sources and X-ray tube for material analysis, and (x) XRD. An 11-inches astronomical Telescope has been installed in the Department as a part of teaching and Public awareness Programs in Astrophysics.

The Department houses Indian Association of Physics Teachers (IAPT) office and actively leads in IAPT, Indian Physics Association activities.

FACULTY

Particular	**Name**	**Field of Research Specialization**
Professors Emeritus	K.N. Pathak	Condensed Matter Physics (Theory)
	Nirmal Singh	Nuclear Physics (Experimental)
	M.M. Gupta	Particle Physics (Theory)
	Suman Bala Beri	High Energy Physics (Experimental)
Professors	Devinder Mehta	Nuclear Physics (Experimental)
	Navdeep Goyal	Condensed Matter Physics (Experimental)
	Rajeev K. Puri **(Chairperson)**	Nuclear Physics (Theory)
	G.S.S.Saini	At. Mol. Spectroscopy (Experimental)
	C. Nagaraja Kumar	Theoretical Physics
	S.K. Tripathi	Condensed Matter Physics (Experimental)
	Sandeep Sahijpal	Astrophysics & Planetary Sciences (Theory)
	Ranjan Kumar *(On leave)*	Condensed Matter Physics (Theory),
	B.R. Behera	Nuclear Physics (Experimental)
	Vipin Bhatnagar	High Energy Physics (Experimental
	Ashok Kumar	Nuclear Physics (Experimental)
	Sunita Srivastva *(On leave)*	Condensed Matter Physics (Theory)
Professor (UGC)	Tankeshwar Kumar (*On leave)*	Condensed Matter (Theory),
Associate Professors	K.S. Bindra	Physics Education
	J.S. Shahi	Nuclear Physics (Experimental)
	Samarjeet Sihotra	Nuclear Physics (Experimental)
Assistant Professors	Manish Dev Sharma	Electronics & Communication (Experimental)
	Neeru Chaudhary	Instrumentation (Experimental)
	Rajesh Kumar	Condensed Matter Physics (Experimental)
	Lokesh Kumar	High Energy Physics (Experimental)
	Sakshi Gautam	Nuclear Physics (Theory)
	Gulsheen Ahuja	High Energy Physics (Theory)
Assistant Professor (UGC)	Dr. Sushil Singh Chauhan	High Energy Physics (Experimental)

COURSES OFFERED (SEMESTER SYSTEM)

Course	**Seats****	**Duration**	**Eligibility*****	**Admission Criteria#**
B.Sc. (Physics) under the framework of	40+6 NRI+2 Foreign National	3 years	10+2 examination (Non-Medical/Medical) with 50% marks from recognized Board/CBSE	Based on PU-CET Under Graduate (UG) Academics: 25%

Honours School System [***Traditional course***]				PU-CET(UG): 75%
B.Sc. Physics (*Specialization in Electronics*) under the framework of Honours School System [***Self-financing course***]*	20+3 NRI+1 Foreign National	3 years	10+2 examination (Non-Medical/ Medical) with 50% marks from recognized Board/CBSE	Based on PU-CET (UG) Academics: 25% PU-CET (UG): 75%
M.Sc. (Physics) under the framework of Honours School System [***Traditional course***]	40+6 NRI+2 Foreign National	2 years	B.Sc. (Pass-course) or B.Sc. (Honours) Physics examination of Panjab University, with Physics and Mathematics as elective subjects with 50% marks, or, any other university examination recognized as equivalent thereto with 50% marks, or, B.Sc. (Honours) in Physics under Choice-based credit system (CBCS) with 50% marks, or, B.Sc. (Honours) in any subject under CBCS with 24 credits in Physics as Generic Elective (GE) subject and Mathematics as Major/GE subject with 50% marks.	Based on PU-CET Post Graduate (PG) Academics: 40% PU-CET(PG): 60% In addition, all the students after passing B.Sc. (Honours) in Physics of Panjab University campus will continue for the respective M.Sc. (Physics) under the framework of Honours School System.
M.Sc. Physics (*Specialization in Electronics*) under the framework of Honours School System [***Self-financing course***]*	20+3 NRI+1 Foreign National	2 years	B.Sc. (Pass-course) or B.Sc. (Honours) Physics examination of Panjab University, with Physics and Mathematics as elective subjects with 50% marks, or, any other university examination recognized as equivalent thereto with 50% marks, or, B.Sc. (Honours) in Physics under CBCS with 50% marks, or, B.Sc. (Honours) in any subject under CBCS with 24 credits in Physics as GE subject and Mathematics as Major/GE subject with 50% marks, or, B.Sc. (Honours) Electronics, or, B.Tech/B.E. (Electronics / Electrical / Mechanical or equivalent) with 50% marks.	Based on PU-CET (PG) Academics: 40% PU-CET(PG): 60% In addition, all the students after passing B.Sc. (Honours) in Physics (*Specialization in Electronics*) of Panjab University campus will continue for respective M.Sc. Physics (*Specialization in Electronics*) under the framework of Honours School System.
PhD.	Subject to Availability	3-6 years	See M.Phil/Ph.D. Prospectus 2021	

* The course fees of "***Self-financing courses***" are substantially higher than the "***Traditional courses***".
** Please carefully read the handbook of information (2021) for details regarding the total number of (convertible/non-convertible) available seats in various courses, the fees structure and the eligibility criteria for the various categories.
***5% Concession is admissible in eligibility marks to SC/ST/BC/PwD candidates.

Important note for candidates:

a) The online submission of the CET(PG) form alone cannot be considered as the application for admission in M.Sc. courses. The candidates applying for admission in the M.Sc. courses have to separately fill the online application form for admission in Physics Department apart from the CET(PG) online form.
b) The candidates applying for the B.Sc. courses should opt for B.Sc. (Physics) and B.Sc. Physics (*Specialization in Electronics*) under the framework of Honours School System in the online CET(UG) form.

TITLES OF SYLLABI: Detailed syllabi available online at http://puchd.ac.in/syllabus.php

B.Sc. (Physics) under the framework of Honours School System -Choice Based Credit System

SEMESTER-I		SEMESTER-II	
Paper-1	Mathematical Physics-I	Paper-1	Electricity and Magnetism
Paper-2	Mechanics	Paper-2	Waves and Optics

Paper-3	AECC-1: English/Environmental Science	Paper-3	AECC-2: English/Environmental Science
Paper-4	General Elective Courses (Any two);	Paper-4	General Elective Courses (Any two);
	Mathematics/Chemistry/Computer Sci./ Statistics/Geology/Economics and any of the subjects offered by Biomedical Science/Life Science Deptts.		Mathematics/Chemistry/Computer Sci./ Statistics/Geology/Economics and any of the subjects offered by Biomedical Science/Life Science Deptts.
SEMESTER-III		**SEMESTER-IV**	
Paper-1	Mathematical Physics-II	Paper-1	Mathematical Physics-III
Paper-2	Thermal Physics	Paper-2	Elements of Modern Physics
Paper-3	Digital Systems and Applications	Paper-3	Analog Systems and Applications
Paper-4	Skill Enhancement Courses (Any one):	Paper-4	Skill Enhancement Courses (Any one):
	Physics Enhancement Skills, Computational Physics Skills, Electrical Circuits and Network Skills, Basic Instrumentation Skills, Renewable Energy and Energy Harvesting		Physics Enhancement Skills, Computational Physics Skills, Electrical Circuits and Network Skills, Basic Instrumentation Skills, Renewable Energy and Energy Harvesting
Paper-5	General Elective Courses (Any one):	Paper-5	General Elective Courses (Any one):
	Mathematics / Chemistry / Biochemistry Biophysics / Geology / Statistics / Economics		Mathematics/Chemistry/ Biochemistry / Biophysics / Geology / Statistics/ Economics
SEMESTER-V		**SEMESTER-VI**	
Paper-1	Quantum Mechanics and Applications	Paper-1	Electromagnetic Theory
Paper-2	Solid State Physics	Paper-2	Statistical Mechanics
Paper-3&4	Discipline Specific Elective Courses (Any two): Nuclear Physics, Experimental Techniques, Atomic and Molecular physics, Particle Physics, Physics of Resonance Techniques	Paper-3&4	Discipline Specific Elective Courses (Any two): Nuclear Physics, Experimental Techniques, Atomic and Molecular physics, Particle Physics, Physics of Resonance Technique

B.Sc. Physics (Specialization in Electronics) under the framework of Honours School System -Choice Based Credit System.

SEMESTER-I		**SEMESTER-II**	
Paper-1	Mathematical Physics-I	Paper-1	Electricity and Magnetism
Paper-2	Mechanics	Paper-2	Waves and Optics
Paper-3	AECC-1: English/Environmental Science	Paper-3	AECC-2: English/Environmental Science
Paper-4	General Elective Courses (Any two);	Paper-4	General Elective Courses (Any two);
	Mathematics/Chemistry/Computer Sci./ Statistics/Geology/Economics and any of the subjects offered by Biomedical Science/Life Science Deptts.		Mathematics/Chemistry/Computer Sci./ Statistics/Geology/Economics and any of the subjects offered by Biomedical Science/Life Science Deptts.
SEMESTER-III		**SEMESTER-IV**	
Paper-1	Mathematical Physics-II	Paper-1	Mathematical Physics-III
Paper-2	Thermal Physics	Paper-2	Elements of Modern Physics
Paper-3	Digital Systems and Applications	Paper-3	Analog Systems and Applications
Paper-4	Skill Enhancement Courses (Any one):	Paper-4	Skill Enhancement Courses (Any one):
	Physics Enhancement Skills, Computational Physics Skills, Electrical Circuits and Network Skills, Basic Instrumentation Skills, Renewable Energy and Energy Harvesting		Physics Enhancement Skills, Computational Physics Skills, Electrical Circuits and Network Skills, Basic Instrumentation Skills, Renewable Energy and Energy Harvesting
Paper-5	General Elective Courses (Any one):	Paper-5	General Elective Courses (Any one):
	Mathematics/ Chemistry/ Biochemistry/Economics/Computer science/Statistics/ Geology and any of the subjects offered by Biomedical Science/Life Science Deptts.		Mathematics/ Chemistry/ Biochemistry / Economics/ Computer science/Statistics/ Geology and any of the subjects offered by Biomedical Science/Life Science Deptts.
SEMESTER-V		**SEMESTER-VI**	
Paper-1	Quantum Mechanics and Applications	Paper-1	Electromagnetic Theory
Paper-2	Solid State Physics	Paper-2	Statistical Mechanics
Paper-3&4	Discipline Specific Elective Courses (Any two): Nuclear Physics, Experimental Techniques, Communication Electronics, Atomic and Molecular Physics, Particle Physics, Physics of Resonance Techniques	Paper-3&4	Discipline Specific Elective Courses (Any two): Nuclear Physics, Experimental Techniques, Communication Electronics, Atomic and Molecular Physics, Particle Physics, Physics of Resonance Techniques

M.Sc. (Physics) under the framework of Honours School System.

SEMESTER-I	**SEMESTER-II**

PHY-MC1: Mathematical Physics-I	PHY-MC6: Mathematical Physics
PHY-MC2: Classical Mechanics	PHY-MC7: Statistical Mechanics
PHY-MC3: Quantum Mechanics	PHY-MC8: Relativistic Quantum Mechanics and quantum Field Theory
PHY-MC4: Electronics-I	PHY-MC9: Classical Electrodynamics
PHY-MC5 : Physics Laboratory PHY-MC5A: Practical Laboratory-I PHY-MC5B: Computer Laboratory-I	PHY-MC10 : Physics Laboratory PHY-MC10A: Practical Laboratory-II PHY-MC10B: Computer Laboratory-II
SEMESTER-III	**SEMESTER-IV**
PHY-MC11: Condensed Matter Physics – I	PHY-MC15: Nuclear Physics-II
PHY-MC12: Nuclear Physics - I	PHY-MC16:Particle Physics-II
PHY-MC13: Particle Physics - I	PHY-MC17: Condensed Matter Physics-II
PHY-MC14: Physics Laboratory-III	Discipline Specific Elective Course-3
Discipline Specific Elective Course-1	Discipline Specific Elective Course-3
Discipline Specific Elective Course-2	General-Elective Course-2
General-Elective Course-1	

M.Sc. Physics (Specialization in Electronics) under the framework of Honours School System.

SEMESTER-I	**SEMESTER-II**
PHE-MC1: Mathematical Physics - I	PHE-MC6: Mathematical Physics-II
PHE-MC2 : Classical Mechanics	PHE-MC7: Statistical Mechanics
PHE-MC3 : Quantum Mechanics	PHE-MC8: Relativistic Quantum Mechanics and Quantum Field Theory
PHE-MC4: Electronics-I	PHE-MC9: Classical Electrodynamics
PHE-MC5 : Physics Laboratory PHE-MC5A: Practical Laboratory-I PHE-MC5B: Computer Laboratory-I	PHE-MC10 : Physics Laboratory-II PHE-MC10A: Practical Laboratory-II PHE-MC10B: Computer Laboratory-II
SEMESTER-III	**SEMESTER-IV**
PHE-MC11: Condensed Matter Physics-I	PHE-MC15 - Electronics V - Advanced Microcontrollers and Microprocessors
PHE-MC12: Electronics III - Microprocessors and Microcontrollers	PHE-MC16 - Electronics VI - Integrated and VLSI Circuit design
PHE-MC13: Electronics IV- Electronics Instrumentation & Power Electronics	PHE-MC17 - Electronics VII - Digital Signal Processing
PHE-MC14: Physics Laboratory-III and project work	Discipline Specific Elective Course-3
Discipline Specific Elective Course-1	Discipline Specific Elective Course-4
Discipline Specific Elective Course-2	General-Elective Course-2
General-Elective Course-1	

THRUST AREAS: Nuclear Physics (Experimental), Nuclear Physics (Theory), Particle Physics (Experimental), Particle Physics (Theory), Condensed Matter Physics (Experimental), Condensed Matter Physics (Theory). Other research areas include Astrophysics and Planetary Sciences (Space Sciences), Molecular Spectroscopy and Physics Education.

PLACEMENTS: The students pursue career in teaching and research after qualifying CSIR/UGC NET. Students qualify various entrance examination/interviews for pursuing research in premier institutes like IISc, TIFR, BARC, DRDO, ISRO, IMSc, RRI, PRL, IIT and IISER. Students also qualify GATE to pursue professional courses, like M.Tech., MCA, etc. Students also qualify GRE for further studies abroad. Significant number of students go for Post-Graduation at TIFR, IISc, IMSc, and IITs after qualifying B.Sc (Hons.) from PU. Students are also placed through PU Central Placement cell.

ALUMNI RELATIONS: The Physics Department has an association of its alumni. Annual meeting of the Physics Department Alumni is a regular feature and held in the month of December. It gives a platform to its alumni to share their experiences and also act as motivator for the students of the Department.

DEPARTMENT OF STATISTICS

ABOUT THE DEPARTMENT

The Department of Statistics was established in 1964 as a part of Mathematics Department and it has been an independent Department since 1974.

The Department offers M.Sc., M.Phil. and Ph.D. Courses in Statistics. The courses are designed to develop analytic and inferential aptitude of the students through theory and rigorous practical assignments along with exposure to practical training during the course of their study.

The Department has been receiving grants under Special Assistance Programme of UGC since April, 2004. At present, the Department is getting financial support from UGC as it has been recognised as DSA (Department under Special Assistance), Phase-III and this shall continue till March 31, 2021. It was a COSIST Department under another UGC scheme, and also a FIST Department under a scheme of the Department of Science and Technology of the Government of India.

It is among one of the active departments in the country carrying out research in the fields of Multiple Comparison Procedures, Reliability and Survival Analysis, Statistical Inference and Applied Statistics (Actuarial Statistics, Bio-Statistics, Econometrics and Income Distributions).

The Department has well equipped Computer laboratory with access to softwares like MINITAB, SPSS, SYSTAT, R, S-PLUS and STATGRAPHICS. The students are given training for usage of R and SPSS for solving their practical assignments. To run the practicals and research work smoothly and without interruption, the department is in possession of a 125 KVA silent DG SET.

Eminent Statisticians from India and other countries keep visiting the Department frequently for delivering lectures and research collaboration. The faculty members attend National and International conferences. Interaction with neighbouring industries in the field of process control and with institutes like PGIMER, GMCH, NIPER, IMTECH and NITTER etc. for providing research consultancy to doctors and researchers is another highlight of the Department of Statistics. The faculty members also collaborate with sister departments for research and data analysis.

The Department of Statistics has an independent Library which has on shelf more than 4000 books and access to more than 30 journals.

FACULTY

Designation	Name	Field of Research Specialization
Professors	Kalpana K Mahajan	Statistical Inference, Applied Statistics, Income Inequality & Lorenz Dominance, Environmental Statistics.
	Kanchan K. Jain	Reliability, Survival Analysis, Distribution Theory, Actuarial Statistics, Bio-Statistics, Measurement Error Models, Income Inequality
	Sangeeta Chopra	Applied Statistics, Income Inequality & Lorenz Dominance, Environmental Statistics, Statistical Inference
	Narinder Kumar	Statistical Inference and Multiple Comparison Procedures
	Suresh K. Sharma	Biostatistics, Statistical Modeling, Ranking and selection and related estimation problems, Statistical Inference, Applied Statistics, Measurement Error Model
Assistant Professors	Manoj Kumar	Linear Models, Econometrics
	Anju Goyal **(Chairperson)**	Ranking and Selection Methodology, Multiple Comparison Procedures, Statistical Inference.
Programmer	Mr. Harminder Singh Deosi	Statistical Programming, Pattern Recognition

COURSES OFFERED (SEMESTER SYSTEM)

Course	Seats	Duration	Eligibility*	Admission Criteria
M.Sc. (Statistics)	34+5 NRI + 2 Foreign National	2 years	BA/B.Sc. (General or Honours) with 50% marks in Math/Stat as major subject of Panjab University or any other university recognized by Panjab University as equivalent thereto. OR BA/B.Sc. (General or Honours) under CBCS with 50% marks in GE Math/Stat of Panjab University or any other University or any other University recognized by Panjab University as equivalent thereto (as per UGC/PU General Guidelines)	Based on P.U. CET (PG) Academics-50% PU CET (PG)-50%
M.Phil	10 (Max) 05 (Min)	1 year	See M.Phil./Ph.D. Prospectus 2021	
Ph.D.	08	3-6 years	See M.Phil./Ph.D. Prospectus 2021	

* 5% Concession is admissible in eligibility marks to SC/ST/BC/PWD candidates.

** For calculation of Merit, Marks of other Universities will be normalized to 2400 marks which are 3-years aggregate marks of B.A/B.Sc. (Gen.) of Panjab University.

*** 15% weightage will be given to those candidates who have done B.Sc. (Honours) only in the subject of Statistics.

TITLES OF SYLLABI: Detailed syllabi available at https://puchd.ac.in/syllabus.php

M. Sc. (Statistics)

Semester-I		Semester-II	
Stat 101	Linear Algebra	Stat 201	Numerical Techniques Using (Theory 1/2 , Practical 1/2)
Stat 102	Distribution Theory (Theory 3/4, Practical 1/4)	Stat 202	Estimation and Testing of Hypotheses (Theory 3/4, Practical 1/4)
Stat 103	Statistical Methods with Packages (Theory 3/4, Practical 1/4)	Stat 203	Sampling Theory and Official Statistics (Theory ¾, Practical ¼)
Stat 104	Real Analysis	Stat 204	Complex Analysis
Stat 105	Course selected from module	Stat 205	Course selected from module
Semester-III		**Semester-IV**	
Stat 301	Nonparametric Inference (Theory 3/4, Practical 1/4)	Stat 401	Multivariate Analysis (Theory 3/4, Practical 1/4)
Stat 302	Statistical Process and Quality Control (Theory 3/4, Practical 1/4)	Stat 402	Design and Analysis of Experiments (Theory 3/4, Practical 1/4)

Stat 303	Linear Inference (Theory 3/4, Practical 1/4)	Stat 403	Course selected from module/*Course selected from the sister Dept. under CBCS system
Stat 304	Course selected from module/ *Course selected from the sister Dept. under CBCS system	Stat 404	Course selected from module/*Course selected from the sister Dept. under CBCS system
		Stat 405	**Project** (It will start from Sem.-III and will end in Sem.-IV)
	Module		**Module**
M 1	Actuarial Statistics	M 7	Operations Research (Theory 3/4, Practical 1/4)
M 2	Categorical Data Analysis	M 8	Reliability
M 3	Econometrics (Theory 3/4, Practical 1/4)	M 9	Simultaneous Inference
M 4	Economic Statistics	M 10	Statistical Simulation and Computational Using R (Theory 1/2, Practical 1/2)
M 5	Advanced Inference (Theory 3/4, Practical 1/4)	M 11	Stochastic Processes
M 6	Measure and Probability Theory	M 12	Survival Analysis

*** Math, Physics and Computer Science are the sister department for M.Sc. (Statistics) students under the CBCS System.**

THRUST AREAS: Multiple Comparison Procedures, Reliability and Survival Analysis, Statistical Inference and Applied Statistics (Actuarial Statistics, Bio-Statistics, Econometrics and Income Distributions).

PLACEMENT: Some good companies visit the department for placing students as Analysts and Data Scientists. Prominent among these are Tata Consultancy Services and Annik Technologies.

ALUMNI RELATIONS: The Alumni Association of the department named as **Statistics Students Alumni Reunion (SSAR)** has ninety members. The efforts are on for inclusion of more members. Some alumni are highly placed as IAS, IPS Officers, research officers and analysts. They keep on providing guidance to the department.

CENTRE FOR MEDICAL PHYSICS

ABOUT THE CENTRE

The Centre for Medical Physics was created in 2007, as joint venture of Panjab University and Post Graduate Institute of Medical Education & Research (PGIMER), Chandigarh, to utilize technology dependent specialties coming out of the new scientific innovations for the immediate need of the society, i.e. good health. Medical Physics is an established clinical specialty with wide ranging applications in Radiotherapy Planning and treatment. It can be defined as embracing all applications of radioactive sources in the treatment of cancerous and non cancerous diseases. The students of Medical Physics discipline gain knowledge about different equipments used in Radiotherapy planning and treatment and their quality assurances. Medical Physicists play a leading role in the areas of radiation safety and development of instrumentation/technology for use in radiation therapy and diagnostic radiology. There is an ample scope for research in the area of medical physics. Atomic Energy Regulatory Board (AERB) is the regulatory body for the M.Sc. Medical Physics Course. The syllabus of Medical Physics course has been designed in such a way that it shall make the student a competent Medical Physicist, Researcher, Radiation Safety Officer and Teacher after qualifying this course. In addition a certification for the Radiation Safety Officer (Level-III) from the Atomic Energy Regulatory Board (AERB) to the students is mandatory for them to be qualified in running the radiation facilities independently and handling of the treatment of patients.

FACULTY

Designation	**Name**	**Field of Research Specialization**
Assistant Professor	Vivek Kumar **(Chairperson)**	Experimental Nuclear Physics & Medical Physics

COURSES OFFERED (SEMESTER SYSTEM):

Course	**Seats****	**Duration**	**Eligibility***	**Criteria**
M.Sc.	10+ 2 NRI	3 years	B.Sc. (Regular course) first class with Physics subject (studied for three years) and Mathematics as one of the subject (studied for minimum two years) from a recognized university. The candidates who studied B.Sc. through correspondence and open university stream are not eligible.	Based on P.U.C.E.T. (PG) P.U.C.E.T. (PG): 60% Academics: 40%
Ph.D.	Subject to availability	3-6 years	See M.Phil/Ph.D. Prospectus-2021.	
*5% Concession is admissible in eligibility marks to SC/ST/BC/PwD candidates **There are no additional seats as mentioned in Handbook of Information-2021.				

TITLES OF SYLLABI: Detailed syllabi available online at http://puchd.ac.in/syllabus.php

M.Sc. (Medical Physics)

Semester I	**Semester II**
Cytology and Fundamental Anatomy of Human Body	Basic Physiology and Cancer Biology
Radiation Detection and Measurements	Analog and Digital Electronics

Radiation Physics and Ethics	Applied Mathematics, Biostatistics and Computer Applications
Radiation Biology	Bio-Medical Applications of Radioisotopes
Semester III	**Semester IV**
Radiotherapy Equipments and Quality Assurances	Brachytherapy Treatment Planning and Radiobiological Models
Medical Imaging Equipments and Quality Assurances	Clinical Dosimetry and Standardization
Basics of Radiation Dosimetry	Principles of Radiation Protection and Radiation Safety
Teletherapy Treatment Planning	Recent Advances in Radiotherapy and Special Techniques
Third Year Internship with Dissertation	

THRUST AREAS: External Beam radiotherapy, Brachytherapy, Radiobiology, Radiation Protection.

PLACEMENTS: The Centre for Medical Physics has 100% placements in the medical Institutions / Universities, accelerator/reactor laboratories. Our students have got placements in the medical institutions like PGIMER (Chandigarh), Govt. Medical College (Chandigarh), Institute of Liver and Biliary Sciences (New Delhi), IGMC (Shimla) and many other hospitals in the country. Students are also pursuing Ph.D. in India and abroad.

ALUMNI RELATIONS: The alumni are invited to celebrate International Day of Medical Physics every year on 7th November on the occasion of birthday of Nobel Laureate Marie Curie and annual alumni meet. It gives a platform to our alumni to share their experiences and also act as motivator for the students of the Centre.

DEPARTMENT OF MICROBIAL BIOTECHNOLOGY

ABOUT THE DEPARTMENT

The department was founded as 'Centre for Microbial Biotechnology' at Panjab University in July 2008 under the aegis of "Centre for Emerging Areas in Science and Technology", with the aim of catering to the needs of the Biotechnology industry. Over the years, the Centre has evolved and transformed into a full-fledged independent department of the University. Currently, it is running from South Campus, Near Dental College, Sector- 25, Panjab University, Chandigarh. The department runs Master's and Doctoral degree program.

The M.Sc. program of the department has been designed in consultation with the experts from both academia and industries keeping in mind the requirements and challenges of the microbial biotechnology research and its translation, along with entrepreneurship. The M.Sc. course comprises of four semesters. First three semesters are dedicated to strengthen theoretical and practical foundation of the students while the fourth semester is dedicated to a research project/dissertation and seminars. The Ph.D. program is open to students who would like to do research in relevant fields.

FACULTY

Designation	**Name**	**Field of Research Specialization**
Professor (Re-employed)	Rupinder Tewari	Industrial Microbiology & Biotechnology
Associate Professor	Rohit Sharma **(Chairperson)**	Industrial Microbiology & Biotechnology
Assistant Professors	Rachna Singh	Medical Microbiology
	Samer Singh **(On Long Leave)**	Microbial Biotechnology

COURSE OFFERED (SEMESTER SYSTEM)

Course	**Seats**	**Duration**	**Eligibility***	**Admission criteria**
M. Sc.	25+02 NRI + 01 Foreign National	2 Years	Bachelors degree in any field of biological sciences including Biotechnology	Based on P.U. CET-(P.G.) Academics: 50% PU(CET(PG): 50%
Ph.D.	Subject to availability	3-6 Years	See M.Phil/ Ph.D. Prospectus 2021	
*5% Concession in admissible in eligibility marks to SC/ST/BC/PwD Candidates				

TITLES OF SYLLABI: Detailed course curriculum available at
https://puchd.ac.in/includes/syllabus/2020/20200928171403-m.sc.microbialbiotechnology2020-21.pdf?202104363202

SEMESTER-I		**SEMESTER-II**	
Paper-1	MBT-101 Microbial Biodiversity and Physiology	Paper-1	MBT-201 Medical Microbiology
Paper-2	MBT-102 Immunology and Immunotechnology	Paper-2	MBT-202 Molecular Biology
Paper-3	MBT-103 Genetics and Recombinant DNA Technology	Paper-3	MBT-203 Industrial Microbiology-1 (Health, Food, Enzymes)
Paper-4	MBT-104Microbial Biochemistry and Enzymology	Paper-4	MBT-204Bioinformatics & Biostatistics
Paper-5	MBT-105 Bioprocess Engineering	Paper-5	MBT-205 Intellectual Property Rights (IPR), Bioethics & Entrepreneurship

SEMESTER-III		SEMESTER-IV	
Paper-1	MBT-301 Advances in Microbial Biotechnology (Genomics, Proteomics, Metabolomics)	Paper-1	MBT-401 Seminar & Tutorials
Paper-2	MBT-302 Industrial Microbiology-II (Environment, Biofuels, Chemicals, Biomass, Protocols)	Paper-2	MBT-402 Dissertation
Paper-3	MBT-303 Bio-instruments and their Applications		
Paper-4	MBT-304Microbial Identification, Diagnostics & Nano-biotechnology		
Paper-5	MBT-305 Tutorials		

THRUST AREAS: Extremozymes, Antimicrobials, Biofilms, Vaccine Development

PLACEMENTS: Placement process has been initiated in the department.

ALUMNI RELATIONS*:* Many students have qualified national level entrance tests for enrolment in Ph.D. and are pursuing Ph.D. programme. Many students have joined corporate jobs; many students have established their own start-up companies.

CENTRE FOR NANO SCIENCE AND NANO TECHNOLOGY

ABOUT THE CENTRE

The research oriented M.Tech progrmame in Nanoscience and nanotechnology was started in 2005 in the University Centre for Instrumentation Micro-electronics (UCIM). Being the first course of its kind in northern part of the country, it was a challenging task to have undertaken. In 2008, the course was placed under the newly formed Centre for Nanoscience and Nanotechnology under University Institute for Emerging Areas in Science and Technology.

The course is of 2 years duration and interdisciplinary in nature emcompassing the areas of Chemistry, Physics, Biology and Engineering. It comprises of conceptual knowledge of nanoscience and nanotechnology, including preparation of nanomaterials, their characterization and applications. Hands-on training is provided to the students at central Sophisticated Analytical Instrumentation Facility (SAIF) of Panjab University on the various instruments relevant to nanotechnology (Electron Microscopes – SEM & TEM), FT NMR Spectrometer (400 Mhz), FTIR/IR and Raman Spectrophotometer, UV-VIS-NIR Spectrophotometer, X-Ray Diffractometer (Powder method), HPLC, Fluorescence Spectrophotometer). The Final year students do their projects in collaboration with industry and reputed laboratories and institutions across India. The passing out students have found excellent employment / research positions at various industries and institutions.

The Centre has close collaboration with national scientific institutions in the country like NPL-Delhi, IIT-Ropar, CSIO-Chandigarh, CSIR-Delhi, NIPER-Mohali and IHPT-Palampur etc. There have been regular interactions with the faculty from these organizations through visits and guest lectures. The centre has recently signed MOU with Saitama University, Japan for students exchange programme.

The Centre is mainly focused on imbibing up-to-date learning in the field of nanoscience and nanotechnology. The Centre is also involved in cutting edge research and innovation through active research and creating state of the art research infrastructure. Faculties of CNSNT are also involved in extensive collaborations with premier research institutes worldwide and are actively engaged in developing novel nanomaterials and technologies for applications in the areas of optoelectronics, nano-plasmonics, biosensing, solar energy harvesting and drug delivery and healthcare.

FACULTY

Designation	Name	Field of Research Specialization
Associate Professor	Sunil Arora **(Chairperson)**	Synthesis and characterization of novel nanomaterials, nano-magnetism, Nano-electronics, Spin-electronics, Epitaxial growth using MBE and sputtering, nanofabrication, Engineering nanoscale defects, 2D layered materials (graphen and transition metal dichalcogenides) synthesis and hetero-interfaces devices.
Assistant Professors	Jadab Sharma	Synthesis of new-age materials, assemblies and fabrication of devices based on such materials for their various applications in nano-plasmonics and photonics and solar energy harvesting.
	Akash Katoch	Interface Engineering of Nanomaterials, Chemiresistive gas sensor, Heavy metal ion detection and energy storage devices
	Bharat Bajaj	Nanomaterials fabrication, Electrospinning, carbon nanofibers
Assistant Professor (Temporary)	Richa Rastogi Thakur	Nano Materials based biosensors for healthcare applications

COURSE OFFERED (SEMESTER SYSTEM)

Course	Seats	Duration	Eligibility*	Admission criteria
M.Tech	15+3 NRI + 1 Foreign National	2 Years	Bachelor's degree (4 years after 10+2) in Engineering / Technology i.e. B.E. / B.Tech (in any branch) or Master's Degree in Physics / Chemistry / Biophysics / Biochemistry / Microbiology / Biotechnology / Nanoscience / Electronics with minimum 50% marks in the aggregate.	Merit based on GATE score and if the seats are not completely filled, candidates without GATE will be allowed on the Academics Merit List.

*5% Concession in admissible in eligibility marks to SC/ST/BC/PwD Candidates

TITLES OF SYLLABI: Detailed course curriculum available at http://puchd.ac.in/syllabus.php

M.Tech

SEMESTER-I		SEMESTER-II	
MNT6101	Foundation of Nanoscience Quantum and Statistical Mechanics	MNT6201	Chemistry of Nanomaterials and Fabrication
MNT6102	Basics of Biology and Biotechnology in Nanoscience and Nanotechnology	MNT6202	Nano-Biotechnology
MNT6103	Foundation of Nanoscience-Physical Chemistry aspects	MNT6203	Physics of Nanomaterials
MNT6104	Synthesis and Characterization of Nano-material	MNT6204	Semiconductor devices in Nanoscience and nanotechnology MEMS and NEMS
MNT6105	Scientific Computation and simulation in Nanoscience and Nanotechnology-I	MNT6205	Advanced Nanomaterials characterization
MNT6106	Laboratory-I	MNT6206	Laboratory II
		MNT6207	Scientific computation and Simulation in Nanoscience and Nanotechnology II
SEMESTER-III		**SEMESTER-IV**	
MNT 7101	Supramolecular and surface Chemistry of Molecular Devices	MNT 7201	Major Project & Thesis
MNT 7102	Nanocomposites: Structure Properties and Performance	MNT 7202	Seminar
MNT 7103	Project & Thesis Preliminary		
MNT 7104	Laboratory III		

THRUST AREAS:

- Use of nanomaterial in Sensing Applications, Nanoparticles in Immunodiagnostics and Healthcare Applications, Metallic Nanoparticles for Pesticide and Contaminants Detection, Design of Polymer Nanocomposites.
- 2D layered materials, Graphene based Devices, Transition Metal Dichalcogenides for Photovoltaic, Optoelectronics.
- Third generation solar cells and interconnect materials.
- Nano-plasmonics and Photonics
- Interface Engineering of nanomaterials, Chemiresistive gas sensor. Heavy metal ion detection and energy storage devices.
- Nanomaterials fabrication, Electrospining Carbon Nanofibers.

CENTRE FOR NUCLEAR MEDICINE

ABOUT THE CENTRE

Nuclear medicine is a medical specialty concerned with the use of safe and small amounts of radioactive materials for diagnostic, therapeutic, and research purposes. More specifically, nuclear medicine is a part of molecular imaging because it produces images which reflect biological processes that take place at the cellular and subcellular levels. Though there are many diagnostic techniques currently available, nuclear medicine uniquely provides information about both the structure and function of virtually every major organ system within the body. It is this ability to characterize and quantify physiologic function which separates nuclear medicine from other imaging modalities, such as x-ray, MRI and ultrasound. A typical nuclear medicine study involves the administration of a radionuclide into the body in order to obtain images of the organs, to perform various body function studies and to treat diseases.

Nuclear medicine experts designated as Nuclear Medicine Physicists are highly skilled individuals and their responsibilities include performing in vivo, radiation safety and quality control procedures. Other responsibilities which include operating the cameras that create images including patient positioning and processing the data for research purposes. The discipline of nuclear medicine also produces dedicated scientists who develop radiopharmaceuticals/radioisotopes for the imaging of organs and therapies.

Vision and mission of the Centre

Nuclear medicine is an emerging area in medicine and is growing at a fast pace in India and there is an urgent need for trained human resource as medical physicists and radiation safety officers for running nuclear medicine departments and industries that use radioisotopes. Therefore, the centre shall provide trained manpower to cater the needs of various hospitals, medical colleges/Institutes and Industry in India and abroad. The mission of the M.Sc. Nuclear Medicine Program at Panjab University is to provide the students an opportunity to achieve expertise both in diagnostic imaging and therapeutics with clinical hands on experience in Nuclear Medicine. The Centre imparts a quality education leading to the award of degree in Masters of Science in Nuclear Medicine and train the students for national/international eligibility test to be designated as certified Radiation safety officers and medical physicists.

Unique features of the course

Panjab University is the second institution after AIIMS to start M.Sc. Course in Nuclear Medicine, which is approved by Atomic Energy regulatory board of India. The course is being conducted jointly with Department of Nuclear Medicine, PGIMER, Chandigarh and the students get ample opportunity for hands on clinical training.

FACULTY

Designation	Name	Field of Research Specialization
Assistant Professor	Dr. Vijayta D. Chadha **(Chairperson)**	Radiation biology and Radiopharmacy

COURSES OFFERED (SEMESTER SYSTEM):

Course	Seats	Duration	Eligibility criteria	Admission criteria
M.Sc.	10+2 NRI	2 years	Minimum qualification for admission to M.Sc. 1st year in Nuclear Medicine shall be B.Sc. degree with at least 50% marks in Nuclear Medicine **or** Biophysics from a recognized university **or** B.Sc. degree from a recognized university **with** Physics and Chemistry as core subjects (Non-Medical stream) **or** Chemistry and Zoology/Biotechnology as core subjects (Medical stream). Candidates with B.Sc. degree in X-Ray/Medical Technology, B.Sc. through correspondence and open University stream are not eligible.	Based on PU-CET (PG) Academics: 50% PU-CET (PG) 50%
Ph.D.	Subject to availability	3-6 years	See M.Phil/Ph.D. Prospectus 2021	
*5% Concession is admissible in eligibility requirement to SC/ST/BC/PwD candidates **There are no additional seats as mentioned in Handbook of Information - 2021				

TITLES OF SYLLABI: Detailed syllabus is available at https://nuclearmedicine.puchd.ac.in/

M.Sc.

SEMESTER-I		SEMESTER-II	
i)	Human Anatomy and Cell physiology	**i)**	Human Physiology, Immunology and Cancer Biology
ii)	Radiation Physics and Applied Mathematics	**ii)**	Electronics, Biomedical instrumentation and Techniques
iii)	Radiation Biology and Chemistry	**iii)**	Biostatistics and Computer applications in Nuclear Medicine
iv)	Radiation Detection and Measurements	**iv)**	Medical Applications of Radioisotopes
SEMESTER-III		**SEMESTER-IV**	
i)	Nuclear Medicine Instrumentation	**i)**	Medical Cyclotron, PET/CT & Allied Instrumentation
ii)	Radiological Protection & Dosimetry-I	**ii)**	Radiological Protection & Dosimetry-II
iii)	Principles and practice of Radiopharmacy	**iii)**	Nuclear Medicine Imaging & Radionuclide Therapy
iv)	Nuclear Medicine Imaging and Non-Imaging Procedures	**iv)**	Recent advances in Nuclear Medicine.

THRUST AREA: To educate individuals to become high quality nuclear medicine technologists and Radiation safety officers. To provide a complete, up-to-date competency-based curriculum. To fulfill the need for nuclear medicine technologists in the local and regional communities.

PLACEMENT: 100% placement of students as Medical physicists and Radiological safety Officers with a starting package of 5-7 lakhs per annum.

ALUMINI RELATIONS: Centre for Nuclear Medicine got the first Batch of M.Sc. Nuclear Medicine passed out in 2009. Till now, 12 Batches have passed out after completion of M.Sc. degree. The Alumni are working with nation renowned institutes/hospital viz PGIMER, Chandigarh; AIIMS, New Delhi; AIIMS, Raipur; AIIMS, Rishikesh; CMC, Ludhiana; Oswal, Ludhiana; Tata memorial hospital, Mumbai; Rajiv Gandhi Cancer speciality hospital, Delhi; Baba Farid university, Faridkot; Safdarjung hospital, Delhi; Max hospital, Chandigarh; Forties Hospital, Mohali; Kailash Cancer Hospital And Research Centre, Gujarat etc.

CENTRE FOR PUBLIC HEALTH

ABOUT THE CENTRE

Panjab University is running Master in Public Health since year 2007 under UIEAST to cater with the emerging needs of the country to produce trained manpower for handling public health issues. Public Health is emerging as one of the most significant areas as health of the citizen is important resource and asset of a nation. Major advances in improvement of health over the next decade will be through the development and application of preventive programmes. Health service delivery systems are undergoing rapid changes. It is important to prepare a task force of experts in domain of public health. This course is being offered to prepare Public Health professional and to strengthen capacity of various Health Organization.

FACULTY

Designation	Name	Field of Research Specialization
Associate Professor	Savita Prashar **(Coordinator)**	Biochemistry
Assistant Professor (Temporary)	Manoj Kumar	Public Health
Guest Faculty	Isha	Molecular Biology

COURSES OFFERED (SEMESTER SYSTEM)

Course	Seats	Duration	Eligibility*	Admission Criteria
Master in Public Health	17+2NRI + 5 in-service**+1 Foreign National	2 Years	Bachelor's degree in any discipline with at least 50% marks from recognized University / Institute	Based on PU-CET (PG) Academics : 50% PU- CET(PG) : 50%
Ph.D	Subject to availability	3-6 Years	See M.Phil/Ph.D Prospectus 2021	

* 5% concession is admissible in eligibility marks to SC/ST/BC/PwD candidates
**Only regular employees in Government organization and having at least one year service experience to be admitted under "In-Service" category. The Candidate has to produce "No Objection Certificate" at the time of admission. In case of non-availability of in-service candidates the seats will be converted into General Category.

TITLES OF SYLLABI : Detailed syllabus available at http://puchd.ac.in/syllabus.php

Master in Public Health

	Semester I		Semester II
Paper I	Basic Concepts in Public Health	Paper I	Biostatistics
Paper II	Basic Epidemiology-I	Paper II	Occupational Health and Safety Management
Paper III	Maternal and Child Health	Paper III	Survey Methods
Paper IV	Basic Computing and Research Methodology	Paper IV	Public Health in Emergencies, Disasters and Conflicts
Paper V	**Open Elective** – Environmental Health	Paper V	Open Elective - Genetics and Public Health or Global Health
Paper VI	Basic Concepts in Life Sciences **OR** Basic Concepts in Social Sciences		
Semester III		**Semester IV**	
Paper I	Basic Epidemiology-II	Paper I	Public Health Law, Ethics and Human Rights
Paper II	Health Economics and Service Planning	Paper II	Health Education and Counseling
Paper III	Health Informatics	Paper III	Dissertation
Paper IV	Elective-Health for Special Groups **OR** Public Health in India and World		
Paper V	Internship*/community outreach activities/ Synopsis		

THRUST AREAS: Health Service, Health Promotions Health Education, Epidemiology, Environmental Health and Nutrition.

PLACEMENTS: Off Campus Placement

ALUMNI RELATIONS: First Alumni meet was held on 07th May, 2016, 2nd Alumni meet was held on 14th April, 2018 and 3rd Global Alumni meet 2021 of Panjab University was conducted in virtual mode at Centre for Public Health on 22nd January 2021.

CENTRE FOR STEM CELL & TISSUE ENGINEERING

ABOUT THE CENTRE

The centre offers two years (four semesters) M.Sc. degree course in Stem Cell & Tissue Engineering. This course was started in 2008 and is intended for graduate students interested in pursuing their careers in the field of stem cell biology. This course will cover the most current knowledge of the principles of stem cell biology, tissue engineering, developmental biology, molecular signaling, genomic, epigenomic & non-genomic regulatory pathways together with immunology, genetics, human anatomy & physiology.

The course curriculum has been designed to provide strong emphasis on experimental training to the students. During the first three semesters students will be imparted strong theoretical and practical trainings. In the fourth semester students will be trained to handle the research work related to the field. They will also be trained to write the projects, make presentations in the form of seminars and journal clubs along with the training in the Research methodologies. A continuous evaluation will be followed.

FACULTY

Particular	Name	Field of Research Specialization
Professor	Sanjeev Puri	Renal Tissue Engineering & Molecular Biology of Renal Pathophysiology
Assistant Professors	Seemha Rai **(Chairperson)**	Cancer Stem Cells
	Anuj Gupta **(Ad-hoc)**	Biochemistry & Cell and Molecular Biology

COURSES OFFERED (SEMESTER SYSTEM)

Course	Seats	Duration	Eligibility*	Admission Criteria

M.Sc.	15+ 2 NRI	2 years	Students securing 50% marks in B.Sc. General / Life Sciences / Basic Medical Science / Engineering (Biotech/ Biomedical) / Pharmaceutical Biotechnology / Dentistry / Medical Laboratory Technology are eligible to apply for the admission to M.Sc. in Stem Cell & Tissue Engineering.	Departmental Test
Ph.D	Subject to availability	3-6 years	See M.Phil / Ph.D prospectus 2021	
* 5% concession is admissible in eligibility marks to SC/ST/BC/PwD candidates				

TITLES OF SYLLABI : Detailed syllabus available at http://puchd.ac.in/syllabus.php

Master in Public Health

Semester I		**Semester II**	
I	Human Anatomy and Physiology	VI	Histology
II	Cell Culture & Cell Technologies	VII	Immunology & Immunogenetics
III	Genomics & Proteomics-I	VIII	Stem Cell Biology-I
IV	Cell and Molecular Biology	IX	Genomics & Proteomics-II
V	Cell and Molecular Techniques	X	Tissue Engineering-I Biomaterials
Semester III		**Semester IV**	
XI	Developmental Biology	XVI	Stem Cell Research Methodology
XII	Stem Cell Signal Transduction & Epigenetic Mechanisms	XVII	Biostatistics and Computational Approach
XIII	Stem Cell Biology-II	XVIII	Journal Club/Seminar
XIV	Stem Cell Translational & Ethics	XIX	Thesis/Project reports; *Viva voce* Examination
XV	Xenoantigens and Stem Cells		

THRUST AREAS: Renal Tissue Engineering & Molecular Biology of Renal Pathophysiology, Cancer Stem Cell, Stem Cell differentiation and Niche, Toxicologic studies and kinetics.

PLACEMENTS: Students are placed in academia as well as industry. In academia, students are pursuing higher studies at prestigious institutes worldwide *viz.* Rosewell Cancer Institute, State University of New York, Buffalo, USA; Duke University School of Medicine; Univ. of Manchester, UK; Monash Univ. Australia; ICGEB, New Delhi etc. and at industry level students are currently placed at various companies *viz.* Parexel International; Cordlife India, GlaxoSmithKline; MDR Labs *etc*.

ALUMNI RELATIONS: Centre for Stem Cell and Tissue Engineering got the first Batch of M.Sc. (Stem Cell and Tissue Engineering) passed out in 2010. Till now Twelve batches have been passed out and two are currently pursuing their M.Sc degree and therefore the Centre has already made an Alumni Association of Stem Cell & Tissue Engineering and a Stem Cell Society. The Centre is keeping an updated information/record about the Alumni placements and is planning to organize Alumni meets/events regular.

CENTRE FOR SYSTEMS BIOLOGY & BIOINFORMATICS

ABOUT THE CENTRE

The Centre of Systems Biology & Bioinformatics was established at Panjab University, Chandigarh in 2007. The emerging field of computational and systems biology represents an integration of concepts and ideas from the biological sciences, engineering disciplines, and computer science. Systems modelling and design are well established in engineering disciplines but are relatively new to biology. Advances in computational and systems biology require multidisciplinary teams with skill in applying principles and tools from engineering and computer science to solve problems in biology and medicine. The curriculum of the 2 year M.Sc. course of Systems Biology and Bioinformatics has a strong emphasis on foundational material to encourage students to become creators of future tools and technologies, rather than merely practitioners of current approaches. Areas of active research in this field include computational biology and bioinformatics, gene and protein networks, molecular biophysics, instrumentation engineering, cell and tissue engineering, predictive toxicology and metabolic engineering, imaging and image informatics, nanobiology and Microsystems, biological design and synthetic biology, neurosystems biology and cancer biology. The Centre has also started Ph.D. Programme and at present five students are pursuing their Ph.Ds.

FACULTY

Particulars	**Name**	**Field of Research Specialization**
Assistant Professors	Ashok Kumar	Cancer Biology and Genomics Network Biology, Data Analytics, Meta Analysis of Cancer Data, National Language Processing, Cohost Studies of Cancer, CADD, Bigdata.
	Tammanna R. Sahrawat **(Chairperson)**	Systems Network Biology Drug poly pharmacology Vector borne diseases.
	Veena Puri	Microarray analysis and A-I based Network Biology, PPI Networks.

COURSES OFFERED (SEMESTER SYSTEM)

Course	**Seats**	**Duration**	**Eligibility***	**Admission Criteria**

M.Sc.	13+2NRI +1 Foreign National	2 Years	Bachelor's degree Science (General or Hons.) with Bioinformatics, Biotechnology, Biochemistry, Biology, Botany, Chemistry, Electronics, Genetics, Life Science, Mathematics, Mathematics & Computing, Microbiology, Physics, Statistics, Zoology, Agriculture, Computer Science, Engineering, Medicine, Pharmacy and Veterinary Science with atleast 50% marks	Based on PU-CET(PG) Academics: 50% PU-CET(PG):50%
* 5% concession is admissible in eligibility marks to SC/ST/BC/PwD candidates				

TITLE OF SYLLABI : Detailed syllabus available at http://puchd.ac.in/syllabus.php

M.Sc.

Semester I		Semester II	
MSBB-101	Biophysical Chemistry of Biomacromolecules	MSBB-201	Spectroscopic Methods in Structural Biology
MSBB-102	Metabolomics and Metabolic Pathway Engineering	MSBB-202	Genomics and Recombinant DNA Technology
MSBB-103	Basic Concepts in Mathematics (For students with Biology Background)	MSBB-203	Computational Methods of Sequence Analysis and biomacromolecular infomatics
MSBB-104	Basic Concepts in Biology (For students with Non-Biology Background)	MSBB-204	Programming in C++ and PERL
MSBB-105	Biostatistics	Practical-210	Based on MSBB 201
MSBB-106	Data Management and Biological Databases	Practical-220	Based on MSBB 202
Practical-110	Based on MSBB 101	Practical-230	Based on MSBB 203
Practical-120	Based on MSBB 102	Practical-240	Based on MSBB 204
Practical-150	Based on MSBB 103	Seminar	On (i) (a) Data Bases and Bioinformatics tools on the internet (b) Modeling tools-visualization and genome matrix (c) solving of structures using different softwares (ii) Journal Club
Semester III		**Semester IV**	
MSBB 301	Computation Cell Biology I	MSBB 401	Computation Cell Biology II
MSBB 302	Systems Biology	MSBB 402	Chemoinformatics
MSBB 303	Proteomics and Systems Biology	MSBB 403	Advance Bioinformatics and Nanotechnology
MSBB 304	Molecular Modeling and Computer aided Drug Design		Project Work and Oral Presentation
Practical 310	Based on MSBB 301		
Practical 320	Based on MSBB 302		
Practical 330	Based on MSBB 303		
Practical 340	Based on MSBB 304		
Seminar	On (i) (a) AMBER & Molecular dynamics, (b) E-cell (c) Pybio-S (d) System Biology bench works (ii) Journal Club		

THRUST AREAS: (I) statistical modelling, Biostatistics and Bioinformatics (ii) Cancer Biology and Genomics (iii) Conformational Studies and Sysbiomic (iv) Microarray data analysis (v) NL P and Data analytics (vi)Structural biology (vii) Molecular modelling.

PLACEMENTS: The Centre has its own placement cell and we approach different companies for placements of our students. Some students get jobs in Pharmaceutical industries like Quantum Solution, Panacea Biotech etc. Many others opt for Ph.D. Programme and Research Projects after completing M.Sc. in our own Centre as well as in adjoining institutes like IMTECH, PGIMER etc. Post Doc, Ph.D in New York, Germany, Canada, Europe, Assistant Professor.

ALUMNI RELATIONS: Since the Centre of Systems Biology & Bioinformatics was established at Panjab University, Chandigarh in 2007 and we are in the process of forming a strong data base for our Alumni.

DEPARTMENT OF ZOOLOGY

ABOUT THE DEPARTMENT:

The Department of Zoology was established at Lahore in 1906 and later shifted first to Hoshiarpur after the partition of country and then to Chandigarh in July 1960. The department is running choice based courses system (CBCS) in both UG and PG classes. The department provides excellent opportunities to students who can acquire training and degree in Zoology through B.Sc. (Honours), M.Sc. (Honours) and Ph.D. programme. The department has been organizing, seminars, symposia, workshops, field trips and other extra-curricular activities from time to time for overall development of the young students.

The Department was awarded Centre of Advanced Studies (CAS-I) by the UGC from April 2007 to April 2012 under the thrust area of Biodiversity: Cell and Molecular Biology with a grant of Rs. 78.25 lacs. The UGC upgraded the department in 2015 to the level of CAS-II for five years with a financial assistance of Rs. 161.55 lacs and two research fellows. The Department was also re-cognised by the Department of Science and Technology in 2013 under its FIST programme and sanctioned a grant of 1.10 crores for 5 years. With this grant a flow cytometry laboratory was established with the most sophisticated LSR Fortessa Cell Analyzer.

The Department is running research projects worth Rs. is ~3.41 crore, funded by different agencies like CCRH, DST (SERB), DBT and UGC. The Department has received grant of 20 Lacs from RUSA for developing skill enhancement courses in Zoology. The department has central sophisticated laboratories well equipped with scientific instruments such as Real Time PCR, 2D Gel Electrophoresis, Ultracentrifuge, HPLC etc.

Some of the major areas of research of the faculty members are Parasitology, Parasitic therapeutics, Cytogenetics, Human genetics, Stem cell therapy, Molecular biology, Immunology, Environmental Toxicology, Systematic Entomology, Applied Entomology, Molecular Genomics, Reproductive Physiology. Aquatic Biology, Wetland Ecology, Fish and Fisheries, Fish Neurotoxicology and Fish Biomaterials.

The Department library is stocked with highly informative text and reference books in addition to national and international journals. The Department houses two state of the art museums having more than 5000 specimens covering the whole Animal Kingdom. The museum boasts of an extensive collection of skeletons, mounted animals and specimens preserved in formalin. The museum is well curated with maintained stock registers listing the scheduled and non-scheduled animals as defined under wildlife (Protection) Act, 1972. The department is running two skill enhancement course in Apiculture and Aquarium Fish Keeping to encourage the students self-employment potential of Applied Zoology.

The Department arranges Educational tour to National Park/ Biodiversity Park/Wild Life Sanctuary/Wetland/Zoo etc. every year for B.Sc. (Honours) students in order to acquaint them with animal diversity.

FACULTY:

Particulars	**Name**	**Field of Research Specialization**
Professors	Sukhbir Kaur	Parasitology, Immunology
	V. K. Walia	Entomology
Associate Professor	Harpreet Kaur ***(Chairperson)***	Parasitology
Assistant Professors	Y.K. Rawal	Fish and Fisheries
	Archana Chauhan	Molecular Biology, Genomics, Ecology
	Ravinder Kumar	Molecular Skin Biology, Stem Cell
	Ravneet Kaur	Fish Neurotoxicology & Fish Biomaterials, Wetland Ecology
	Mani Chopra	Cytogenetics, Cell- Biology, Molecular toxicology
	Indu Sharma	Reproductive Physiology Molecular Biology
	Vijay Kumar	Human Genetics, Molecular Biology
DST INSPIRE Faculty	Ranjana Jaiswara	Entomology

COURSES OFFERED (SEMESTER SYSTEM)

Course	**Seats**	**Duration**	**Eligibility***	**Admission Criteria**
B.Sc. (Honours)	25+4 NRI+ 1 Foreign National	3 years	Passed 10+2 examination with at least 50% marks with Physics, Chemistry, Biology and English.	Based on CET (UG) PU CET UG – 75% Academics – 25%
M. Sc. (Honours)	14+2 NRI + 1 Foreign National	2 years	B Sc. (Pass or Hons.) with 50% marks in the examination of P.U. or any other examination recognized by P.U. as equivalent thereto with Zoology as one of the elective subject	Based on CET (PG) PU-CET PG – 60% Academics – 40%
M. Phil.	10	1 year	See M.phil / Ph.D prospectus 2021	
Ph. D.	Subject to availability	3-6 years	See M.phil / Ph.D prospectus 2021	
*5% Concession in admissible in eligibility marks to SC/ST/BC/PwD Candidates				

TITLES OF SYLLABI: Detailed course curriculum is available at https://puchd.ac.in/syllabus

B.Sc. (Honours) Choice Based Credit System (CBCS) under the framework of Honours School System

SEMESTER I	**SEMESTER II**
BZO-C1: Non-Chordates I: Protista to Pseudocoelomates	BZO-C3: Non-Chordates II: Coelomates
BZO-C2: Principles of Ecology	BZO-C4: Cell Biology
BZO-AECC1: English	BZO: AECC2: Environmental Science
BZO-C-GE1: Animal Diversity	BZO-C-GE2: Human Physiology
SEMESTER III	**SEMESTER IV**
BZO-C5: Diversity of Chordates	BZO-C8: Comparative Anatomy of Vertebrates
BZO-C6: Physiology: Controlling and Coordinating Systems	BZO-C9: Physiology: Life Sustaining Systems
BZO-C7: Fundamentals of Biochemistry	BZO-C10: Biochemistry of Metabolic Processes
SEC*	SEC*
BZO-C-GE3: Insect Vector and Diseases	BZO-C-GE4: Aquatic Biology
SEMESTER V	**SEMESTER VI**
BZO-C11: Molecular Biology	BZO-C13: Developmental Biology

BZO-C12: Principles of Genetics	BZO-C14: Evolutionary Biology
DSE**	DSE**
DSE**	DSE**

C: Core Courses; GE: General Elective; AECC: Ability Enhancement Compulsory Courses; SEC: Skill Enhancement Courses; DSE: Discipline Specific Elective

***SKILL ENHANCEMENT COURSES (any one per semester in semesters 3-4)**

1. BZO-SEC1: Apiculture
2. BZO-SEC2: Aquarium Fish Keeping
3. BZO-SEC3: Medical Diagnostics
4. BZO-SEC4: Research Methodology

****DISCIPLINE SPECIFIC ELECTIVE COURSES (any two per semester in semesters 5-6)**

5. BZO-DSE1: Endocrinology
6. BZO-DSE2: Reproductive Biology
7. BZO-DSE3: Wild Life Conservation and Management
8. BZO-DSE4: Animal Biotechnology
9. BZO-DSE5: Fish and Fisheries
10. BZO-DSE6: Parasitology
11. BZO-DSE7: Immunology
12. BZO-DSE8: Biology of Insecta

GENERAL ELECTIVE SUBJECTS (Offered by Zoology Department) for students of other departments

Code	Generic Elective Subject	Pre-requisite
BZO-C-GE1:	Animal Diversity	10+2 Biology
BZO-C-GE2	Human Physiology	10+2 Biology
BZO-C-GE3	Insect Vector and Diseases	10+2 Biology
BZO-C-GE4	Aquatic Biology	10+2 Biology

Note: A Department will run a particular Skill Enhancement Course, Discipline Specific Elective Course and General Elective Course only if the minimum number of students opting for that course is 10
Outlines for Semester II will be same as for Semester I

M.Sc.(Honours)

Choice Based Credit System (CBCS) under the framework of Honours School System

SEMESTER I		SEMESTER II	
MZO-MC1	Advanced Cell Biology	MZO-MC5	Biology of Vertebrate Immune System
MZO-MC2	Aquaculture & Fisheries	MZO-MC6	Methods and applications of Molecular Biology
MZO-MC3	Insect Ecology and Physiology	MZO-MC7	Environmental and Quantitative Biology
MZO-MC4	Biology of Parasites	MZO-MC8	Methodology and Instrumentation
SEMESTER III		**SEMESTER IV**	
MZO-MC9	Animal Physiology	MZO-ME*	Elective -1*
MZO-MC10	Developmental Biology	MZO-ME**	Elective -2**
MZO-MC11	Animal Biochemistry		Project Report/Dissertation -Major
	Project Report/Dissertation -Minor		

*** Elective 1 will be selected from the options given below:**

MZO-ME1.	Concepts of Parasitology
MZO-ME2.	Economic Entomology
MZO-ME3.	Molecular Cytogenetics
MZO-ME4.	Molecular Endocrinology and Reproductive Physiology
MZO-ME5.	Fish, Fisheries and Aquatic Biology

**** Elective 2 will be selected from the options given below:**

MZO-ME6.	Animal Cell Culture and its Applications
MZO-ME7.	Biosystematics and Introduction to Bioinformatics
MZO-ME8.	Concepts in Human Genetics and Related Disorders
MZO-ME9.	Metabolic Disorders
MZO-ME10.	Biomaterials and Nanobiology

THRUST AREAS: Fish & Fisheries, Cell & Molecular Biology, Entomology, Parasitology and Reproductive Physiology.

PLACEMENTS: At present the department is coordinating with the Central Placement Cell, Panjab University for placement of students of the department. However, the department is exploring the possibilities for placement of students at graduate, post graduate and post-doctoral levels.

ALUMNI RELATIONS: The department also has an Alumni Association and a Zoological Society. Alumni from this department occupy important positions in academic and administrative areas. The faculty and students are members of the society which caters to academic and extra-curricular needs of its members.

UNIVERSITY INSTITUTE OF FASHION TECHNOLOGY AND VOCATIONAL DEVELOPMENT

ABOUT THE INSTITUTE

University Institute of Fashion Technology and Vocational Development (UIFT&VD) is an in-Campus Institute, established by the Panjab University, Chandigarh in 2007 as a commitment to carry forward its goal of providing trained professionals for the fast growing fashion, apparel, and textile industry in the region in particular and the country in general. UIFT&VD offers a prestigious Five Year Integrated B.Sc. & M.Sc. Degree in Fashion and Lifestyle Technology. The program laid out in a semester

system focuses on self-sustaining education and training in fashion and lifestyle technology. First three years of the course comprise of Foundation and Core Studies of which sixth semester entails Industrial Training with an option to undertake an Industry or a Design Project. The students are awarded a B.Sc. Degree in Fashion & Lifestyle Technology on the completion of the course. With showcasing a Design Collection and having an insight of the Retail Business of Branded Fashion the course prepares the students for decent earning and self-employment.

Two years spent in M.Sc. Fashion & Lifestyle Technology have the students take up across the country visits for Craft Documentation. They undergo extensive specialized research followed by seminars and presentations. An intensive study of Organization and Management Skills required to run a Fashion and Lifestyle Business further prepares the students to find their niche' in the work sphere.

Highly trained and experienced faculty is involved in giving thorough theoretical and practical knowledge inputs to the students. This, along with assistance rendered to lead the students in task based studies helps the young learners to hone their talent to face the challenging requirements of the Fashion Industry.

To move into the global mainstream of intense economic competition and to reckon with requirement of the Fashion Industry of India in totality, the Department liaises with fashion related organizations for guiding the students in handling latest technology. There is regular interaction with experts at Design Studios, Production Houses, Distribution Centres and Retail Establishments as well as the Industry to form a vital bridge between University Institute of Fashion Technology and the larger community. Through an MOU with Nottingham Trent University, U.K. a series of exchanges have begun, giving rise to cross cultural teaching and learning process.

The department offers state of the art equipment for hands on experience of the students. A proposed Resource Centre and an Amphitheatre shall take the Institute to the next level in terms of infrastructural facilities**.**

FACULTY

Designation	Name	Field of Research Specialization
Assistant Professors	Anu H. Gupta **(Chairperson)**	Clothing & Textiles
	Prabhdip Brar	Apparel Design, Art History & Fine Arts
	Rita Kant	Clothing & Textiles

COURSE OFFERED (SEMESTER SYSTEM)

Course	Seats	Duration	Eligibility*	Admission Criteria
B.Sc.	46 + 6 NRI + 2 Foreign National	3 Years	Passed 10+2 Examination with atleast 50% marks in aggregate from CBSE or any other recognized Board.	Based on Aptitude Test** Aptitude Test: 60% Academics: 20% Preference Criteria: 10% Interview: 10%
M.Sc.	46 + 6 NRI + 2 Foreign National	2 Years	Passed B.Sc. Fashion & Lifestyle Technology from UIFT, PU. **Lateral Entry:** Lateral Entry will be allowed in case any seats are left vacant. Eligibility is as under:- Passed B.Sc. (Fashion Designing) examination with at least 50% marks in aggregate from PU, or an examination from any other university recognized as equivalent thereto.	Based on Aptitude Test*** Aptitude Test: 45% Academics: 40% Group Discussion: 05% Interview: 10%
Ph.D	Subject to availability	3-5 years	See M.Phil/Ph.D Prospectus 2021	As per UGC/P.U. norms

* 5% concession admissible in eligibility marks to SC/ST/BC/PwD candidates.

** **For B.Sc**.: Aptitude test will comprise of **(a) General Ability Test** : There will be a written test for analytical reasoning, quantitative aptitude, communication skills in English, General Knowledge and current affairs. **(b) Creative Ability Test:** There will be a practical test of creative skill, freehand drawing, sketching and development of a 3D model for any given theme (material list will be provided in advance so that the candidate can bring their own material for the test). Candidates who have studied Fashion Design / Fine arts subjects in 10+2 will be given 10% weightage in the total marks scored. Candidate must score at least 50% marks in aggregate (Academics exam + Aptitude test + Preference Criteria + Interview).

*** **For M.Sc.**: Aptitude test will comprise of **written test** to evaluate general ability and subject knowledge and **practical test** to evaluate creative ability. **Creative ability test**: Material list will be provided in advance so that the candidates can bring their own material for the test. Group Discussion will be on the topics related to Fashion and Lifestyle Technology.
Candidate must score at least 50% marks in aggregate (Academics + Aptitude test + Preference Criteria + Interview+ Group Discussion).

TITLES OF SYLLABI : Detailed syllabus available at http://puchd.ac.in/syllabus.php

B.Sc

Semester-I		Semester –II	
Paper-1	English-I (Th.)	Paper-1	English-II (Th.)
Paper -2	Visual Design -I (Pr.)	Paper -2	Fabric Technology-II (Th.)

Paper -3	Fine Art & Fashion Illustration-I (Pr.)	Paper -3	Fine Art & Fashion Illustration -II (Practical)
Paper -4	Introduction to Sewing Techniques (Pr.)	Paper -4	Visual Design -II (Pr.)
Paper -5	Fabric Technology-I (Th.)	Paper -5	Pattern Development-I (Pr.)
Paper -6	Creative Techniques (Pr.)	Paper -6	Fabric Handling (Pr.)
Paper -7	Fashion Studies-I (Th.)	Paper -7	Sewing Techniques (Pr.)
Paper -8	Computer Graphics-I (Pr.)	Paper - 8	Computer Graphics-II (Pr.)
	Lifestyle Management -I/Tutorial		Lifestyle Management II/Tutorial
Semester-III		**Semester-IV**	
Paper-1	English-III (Th.)	Paper-1	English-IV (Th.)
Paper -2	History of Indian Costumes (Th.)	Paper -2	History of World Costumes (Th.)
Paper -3	Fabric Technology –III (Th.)	Paper -3	Traditional Indian Textiles and Embroideries (Pr.)
Paper -4	Project Based Fashion Studies (Pr.)	Paper -4	Fabric Technology-IV (Pr.)
Paper -5	Design Process –I (Pr.)	Paper -5	Design Process II (Pr.)
Paper -6	Fine Art & Fashion Illustration –III (Pr.)	Paper -6	Fine Art & Fashion Illustration IV (Pr.)
Paper -7	Advance Pattern Development (Pr.)	Paper -7	Advanced Pattern Development and Draping (Pr.)
Paper 8	Garment Construction Technology –I (Pr.)	Paper 8	Garment Construction Technology II (Pr.)
Paper 9	Computer Graphics –III (Pr.)	Paper 9	Computer Graphics IV (Pr.)
	Lifestyle Management III/Tutorial		Lifestyle Management IV/Tutorial
Semester-V		**Semester-VI**	
Paper-1	English-V (Th.)	Paper-1	English-VI (Th.)
Paper -2	Fundamentals of Marketing (Th.)	Paper -2	Apparel & Textile Merchandising (Th.)
Paper -3	Fashion Journalism (Th.)	Paper -3	Personality & Clothing (Th.)
Paper -4	Quantitative methods for Fashion Technology (Th.)	Paper -4	Fine Art & Fashion Illustration for Design Collection VI (Pr.) I. Design Development (Pr.) II. Pattern Development (Pr.) III. Product Development (Pr.)
Paper -5	Basics of Weaving Technology (Pr.)	Paper -5	Computer Graphics VI (Pr.)
Paper -6	Basics of Knitting Technology (Pr.)	Paper -6	Fashion Photography (Pr.)
Paper -7	Fine Art & Fashion Illustration V (Pr.)	Paper -7	Portfolio Making (Pr.)
Paper -8	Pattern Development IV (Pr.)	Paper- 8	In plant Training Project & Seminar
Paper- 9	Commercial Clothing I (Pr.)		Lifestyle Management VI/Tutorial
Paper- 10	Computer Graphics V (Pr.)		
	Lifestyle Management V/Tutorial		

M.Sc.

Semester-I		**Semester-II**	
Paper-1	Fashion Retail Management- I (Th.)	Paper-1	Fashion Retail Management- II (Th.)
Paper -2	Research Methodology in Fashion & Lifestyle Technology-I(Th.)	Paper -2	Research Methodology in Fashion & Lifestyle Technology-II (Th.)
Paper -3	Statistical Techniques in Fashion & Lifestyle Technology-I (Th.)	Paper -3	Statistical Techniques in Fashion & Lifestyle Technology-II (Th.)
Paper -4	Textile Testing (Th.)	Paper -4	Textile Chemistry (Th.)
Paper -5	Textile Testing (Pr.)	Paper -5	Textile Chemistry (Pr.)
Paper -6	CAD Fashion Studio-I (Th.)	Paper -6	CAD Fashion Studio-II (Pr.)
Paper -7	*Apparel Core (kids wear) (Pr.) • Design Development • Pattern Development • Product Development	Paper -7	*Apparel Core (Women's wear) (Pr.) • Design Development • Pattern Development • Product Development
Paper -8	Craft Survey & Documentation (Pr.)	Paper -8	Dissertation Seminar – II Research: Development of Tool for Pilot Study; Selection of Sample, Research Design and Data Collection. Product: Development of Tool to Test Proof of Product Concept, Prototype Development, Alpha testing, Research Design and Data Collection.
Paper -9	Dissertation Seminar-I Presenting Proof of Concept; Review of Literature; Broad question of enquiry as reflected in the Title of proposed Research or Project.		Lifestyle Management VIII/Tutorial
	Lifestyle Management VII/Tutorial		
Semester-III		**Semester-IV**	
Paper-1	Industrial Management (Th.)	Paper-1	Entrepreneurship Development (Th.)

Paper -2	Quality Management (Th.)	Paper -2	Development of High Fashion Structured Garments (Pr.)
Paper -3	CAD Fashion Studio-III (Pr.)	Paper -3	Port Folio Development (Pr.)
Paper -4	**Apparel Core (Men's Wear) (Pr.) • Design Development • Pattern Development • Product Development	Paper -4	Technical Advances in Textile Material (Th.)
Paper -5	Dissertation Seminar – III Research: Final Data Collection, Scoring and Analysis of Data thru SPSS or any suitable Software. Product: Final Data Collection and Beta testing for acceptability of Product; Proposed steps of Product promotion and Product launch.	Paper -5	Research: Submission of Research Document, Presentation and Viva Product: Submission of Documented Product Development Process, Presentation and Exhibition of Product/Products with Viva.
	Lifestyle Management IX/Tutorial		Lifestyle Management X/Tutorial

THRUST AREAS: Product & Line Development, Fashion Design, Illustration, Traditional Textile Embroidery, Research Projects, Fashion Event Management, Surface Design, CAD, Textile Technology, Visual Merchandizing, Fashion Forecasting and Media Reporting**.**

PLACEMENTS: The Department continues to support students by arranging for on-campus and off-campus placements in reputed organizations. Many students opt for self-employment and spring up as successful entrepreneurs. The students who opt for placements are helped in securing good jobs in different organizations of their own choices.

ALUMNI RELATION: Alumni from this department have been suitably employed in academics, industry and many have been able to establish themselves as successful entrepreneurs. They are regularly supporting the department in terms of lectures and suggestions from their industrial experience. Many of them visit the department and address students in order to prepare them for their future and help in arranging industrial exposure, training and placements. A face book page supports the activities of the department where alumini are also members.