RAMAKRISHNA MISSION
VIVEKANANDA CENTENARY COLLEGE
P.O. RAHARA, KOLKATA-700118
WEST BENGAL, INDIA

Botany	6 pages
Chemistry	6 pages
Physics	3 pages
Mathematics	4 pages
Microbiology	5 pages
Zoology	10 pages
Computer Science	6 pages

Programme Code	UGBOT
Programme Name	BSc. Botany Honours

	Relevance to the local, national, regional and global developmental needs						
Sl. No.	Course code	Course Name	Developmental Needs				Rationale
			Local	Regional	National	Global	
1	UGBOTCC01	Phycology and Microbiology	✓	✓	✓	✓	Students will be able to understand and evaluate the structure, diversity, reproduction and evolution of microbes including algae from local to global scale.
2	UGBOTCC02	Biomolecules and Cell Biology			✓	✓	Students will be able to understand the cellular structure from prokaryotes to eukaryotes along with various biological macromolecules occurring therein.
3	UGBOTCC03	Mycology and Phytopathology		✓	✓	✓	A detailed account of various plant diseases has been included alongwith their fungal pathogen, mechanism of infection and control measure.
4	UGBOTCC04	Archegoniate	✓	✓	✓	✓	Course includes diversity, structure, reproduction and evolution of bryophyte, pteridophyte and gymnosperms.
5	UGBOTCC05	Anatomy of Angiosperms			✓	✓	A detailed account of the plant internal structure, their function in the plant body and its components.
6	UGBOTCC06	Economic Botany	✓	✓	✓	✓	The course intersects many fields including established disciplines such as food crops, cash crops, fruits, medicinal plants, etc and their significance in human life.
7	UGBOTCC07	Genetics				✓	The course provides information about inheritance of traits, karyotyping & chromosomal structure and disorders and pedigree analysis.

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Sl. No.	Course code	Course Name	Developmental Needs				Rationale
			Local	Regional	National	Global	
8	UGBOTCC08	Molecular Biology				✓	The course provides information about gene function, regulation, silencing and maintenance of life at the molecular level.
9	UGBOTCC09	Plant Ecology and Phytogeography	✓	✓	✓	✓	The course aims to analyse ecosystem, biodiversity, conservation and community its management at local to the global level.
10	UGBOTCC10	Plant Systematics	✓	✓	✓	✓	Course includes morphology, diversity, classification and evolution of angiosperms.
11	UGBOTCC11	Reproductive Biology of Angiosperms			✓	✓	Students will be able to understand about pre-reproductive, reproductive and post-reproductive events in plants.
12	UGBOTCC12	Plant Physiology		✓	✓	✓	The course comprises various physiological activities occurring within plants and their significance.
13	UGBOTCC13	Plant Metabolism		✓	✓	✓	The course provides a detailed account of the various metabolic activities occurring within plants.
14	UGBOTCC14	Plant Biotechnology			✓	✓	Course includes a detailed account of the plant tissue culture technique and genetic engineering.
15	UGBOTDSE01	Industrial and Environmental Microbiology	✓	✓	✓	✓	Students will be able to understand the economic aspects of microbes and their ecological role.
16	UGBOTDSE02	Plant Breeding		✓	✓	✓	Course includes a detailed account of the plant breeding techniques and methods of selection and domestication of crops.
17	UGBOTDSE03	Biostatistics		✓	✓	✓	The Course includes descriptive statistics, diagrammatic data representation, data analysis techniques, and its representation.

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Sl. No.	Course code	Course Name	Developmental Needs				Rationale
			Local	Regional	National	Global	
18	UGBOTDSE04	Applied Phycology		✓	✓	✓	The course describes the beneficial and harmful activities of algae and their application in human welfare.
19	UGBOTDSE05	Research Methodology			✓	✓	The course provides knowledge on design to perform research work allowing students to take research at the national and global level.
20	UGBOTSEC01	Value Education and Indian Culture	✓	✓	✓	✓	The knowledge and practice of self-evaluation & Personality Development help them to be accustom with the work environment at local, regional, national and global level.
21	UGBOTSEC02	Online Course (In collaboration with IIT Bombay)			✓	✓	The course provides basic knowledge on computer and its application in biological research.
22	UGBOTGE01	Cryptogamic Botany	✓	✓	✓	✓	Course includes diversity, structure, reproduction and evolution of non flowering plants from local to global level.
23	UGBOTGE02	Biology of Vascular Plants	✓	✓	✓	✓	Course includes diversity, structure, reproduction and evolution of higher vascular plants from local to global level.
24	UGBOTGE03	Plant Ecology, Anatomy and Embryology	✓	✓	✓	✓	Course provides information on ecological and anatomical aspects of higher plants.
25	UGBOTGE04	Plant Physiology and Biotechnology	✓	✓	✓	✓	Course provides information on plant physiology, metabolism and biotechnology.

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Programme Code	PGBOT
Programme Name	M. Sc. Botany

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	Relevance to the local, national, regional and global developmental needs						
Sl. No.	Course code	Course Name	Developmental Needs				Rationale
			Local	Regional	National	Global	
1	PGBOTCC1.1 (Th)	Phycology + Microbiology	✓	✓	✓	✓	The course includes details of structure, metabolism, diversity, and evolution of microbes and algae from local to global scale.
2	PGBOTCC1.2 (Th)	Mycology + Plant Pathology	✓	✓	✓	✓	The course provides epidemiology of plant diseases, their fungal pathogen, molecular and genetic mechanism of infection and resistance.
3	PGBOTCC1.3 (Th)	Biostatistics + Biophysics		✓	✓	✓	The course includes descriptive statistics, data analysis, tools and techniques, and their representation.
4	PGBOTCC1.4 (Th)	Ecology + Evolution	✓	✓	✓	✓	The course includes detailed environmental analysis, biodiversity, conservation and community at the global level.
5	PGBOTCC1.5 (Pr)	Phycology + Microbiology	✓	✓	✓	✓	Provides hands on training on lab techniques in microbiology and algae.
6	PGBOTCC1.6 (Pr)	Mycology + Plant Pathology	✓	✓	✓	✓	Identification of plant pathogens, their culture and design experiments to control them.
7	PGBOTCC2.1 (Th)	Plant Anatomy + Developmental Biology			✓	✓	Provides a global outlook of plant internal structure and molecular mechanism of vegetative and reproductive development.
8	PGBOTCC2.2 (Th)	Taxonomy of Angiosperms + Embryology of Seed Plants	✓	✓	✓	✓	The course provides an overview of the modern trends in plant taxonomy and systematics and basis of modern system of classification.

Sl. No.	Course code	Course Name	Developmental Needs				Rationale
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9	PGBOTCC2.3 (Th)	Biochemistry & Metabolism + Plant Physiology		✓	✓	✓	The course aims to analyse the complex nature of the physiological activities and the metabolic reactions occurring within plant cells.
10	PGBOTCC2.4 (Th)	Environmental Science + System Biology	✓	✓	✓	✓	Students will be able to comprehend the importance of nature, sustainable development, conservation of natural resources.
11	PGBOTCC2.5 (Pr)	Taxonomy + Plant Anatomy		✓	✓	✓	Hands on training on plant microtechniques, staining and dissection of plant specimens, preparation of artificial key.
12	PGBOTCC2.6 (Pr)	Biochemistry + Plant Physiology		✓	✓	✓	Students will be able to demonstrate and analyze the physiological activities, effect of various compounds on them.
13	PGBOTCC3.1 (Th)	Cell & Molecular Biology		✓	✓	✓	The course provides information about gene function, regulation, silencing and maintenance of life at the molecular level.
14	PGBOTCC3.2 (Th)	Genetics & Genomics		✓	✓	✓	Course includes a detailed account of the plant genes and genomes, their annotation, basic concept on bioinformatic analyses.
15	PGBOTCC3.3 (Th)	Plant Biotechnology & Recombinant DNA technology		✓	✓	✓	Course includes a detailed account of the plant tissue culture technique, gene editing and genetic engineering.
16	PGBOTCC3.4 (Th)	Allied Elective			✓	✓	Course provides a hands on training on softwares impicated for biological data analysis.
17	PGBOTCC3.5 (Pr)	Plant Biotechnology		✓	✓	✓	Hands on training on plant tissue culture, plant transformation and RDT.

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18	PGBOTCC3.6 (Pr)	Cytology and Molecular Biology		✓	✓	✓	Analysis of plant chromosomes, karyotyping, and detection of abnormalities.
19	PGBOTCC4.1 (Th)	Research Methodology & Bio-Instrumentation			✓	✓	The course provides knowledge to perform biological research, research ethics and handling of instruments.
20	PGBOTCC4.2 (Th)	Phytochemistry & Herbal Technology	✓	✓	✓	✓	The Course includes a detailed account of plant bioactive compounds and their uses as medicinal plants.
21	PGBOTME4.3A (Th)	Genetics and Plant Biotechnology - I (Major Elective)		✓	✓	✓	Advanced genetic analysis for specialization in the subject area.
22	PGBOTME4.4A (Pr)	Genetics and Plant Biotechnology - I (Major Elective)		✓	✓	✓	Advanced analysis of genes and genomes, their annotation and characterization for specialization in the subject area.
23	PGBOTME4.3B (Th)	Diversity and Ecology of algae (Major Elective)	✓	✓	✓	✓	Advanced analysis of algal ecology for specialization in the subject area.
24	PGBOTME4.4B (Pr)	Advanced phycology and algal biotechnology (Major Elective)		✓	✓	✓	Advanced study of algal biotechnology for specialization in the subject area.
25	PGBOTME4.3C (Th)	Taxonomy of Angiosperms (Major Elective)	✓	✓	✓	✓	Advanced analysis of plant systematics for specialization in the subject area.
26	PGBOTME4.4C (Pr)	Taxonomy of Angiosperms (Major Elective)	✓	✓	✓	✓	Comparative study of plant taxonomic analysis for specialization in the subject area.

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PROGRAMME CODE	UGCHEM
PROGRAMME NAME	BSc. Chemistry Honours

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Sl No	Course Code	Title of the course	Local	Regional	National	Global	Remarks
1	UGCHEMCC01	Organic Chemistry 01	✓	✓	✓	✓	The knowledge on organic chemistry will be applicable in regional, local, national and global aspects.
2	UGCHEMCC02	Physical Chemistry 01	✓	✓	✓	✓	The knowledge on physical chemistry will be applicable in regional, local, national and global aspects.
3	UGCHEMCC03	Inorganic Chemistry 01	✓	✓	✓	✓	The knowledge on inorganic chemistry will be applicable in regional, local, national and global aspects.
4	UGCHEMCC04	Organic Chemistry 02	✓	✓	✓	✓	The knowledge on organic chemistry will be applicable in regional, local, national and global aspects.
5	UGCHEMCC05	Physical Chemistry 02	✓	✓	✓	✓	The knowledge on physical chemistry will be applicable in regional, local, national and global aspects.
6	UGCHEMCC06	Inorganic Chemistry 02	✓	✓	✓	✓	The knowledge on inorganic chemistry will be applicable in regional, local, national and global aspects.
7	UGCHEMCC07	Organic Chemistry 03	✓	✓	✓	✓	The knowledge on organic chemistry will be applicable in regional, local, national and global aspects.
8	UGCHEMCC08	Physical Chemistry 03	✓	✓	✓	✓	The knowledge on physical chemistry will be applicable in regional, local, national and global aspects.
9	UGCHEMCC09	Inorganic Chemistry 03	✓	✓	✓	✓	The knowledge on inorganic chemistry will be applicable in regional, local, national and global aspects.
10	UGCHEMCC10	Organic Chemistry 04	✓	✓	✓	✓	The knowledge on organic chemistry will be applicable in regional, local, national and global aspects.
11	UGCHEMCC11	Inorganic Chemistry 04	✓	✓	✓	✓	The knowledge on inorganic chemistry will be applicable in regional, local, national and global aspects.
12	UGCHEMCC12	Organic Chemistry 05	✓	✓	✓	✓	The knowledge on organic chemistry will be applicable in regional, local, national and global aspects.

Sl No	Course Code	Title of the course	Local	Regional	National	Global	Remarks
13	UGCHEMCC13	Inorganic Chemistry 05	✓	✓	✓	✓	The knowledge on inorganic chemistry will be applicable in regional, local, national and global aspects.
14	UGCHEMCC14	Physical Chemistry 04	✓	✓	✓	✓	The knowledge on physical chemistry will be applicable in regional, local, national and global aspects.
15	UGCHEMDSE01	Advanced Physical Chemistry	✓	✓	✓	✓	The knowledge on advanced physical chemistry will be applicable in regional, local, national and global aspects.
16	UGCHEMDSE02	Analytical Methods of Chemistry	✓	✓	✓	✓	The knowledge on analytical chemistry will be applicable in regional, local, national and global aspects.
17	UGCHEMDSE03	Green Chemistry	✓	✓	✓	✓	The knowledge on green chemistry will be applicable in regional, local, national and global aspects.
18	UGCHEMDSE04	Inorganic Materials of Industrial Importance	✓	✓	✓	✓	The knowledge on industrially important inorganic materials will be applicable in regional, local, national and global aspects.
19	UGCHEMDSE05	Industrial Chemicals and Environment	✓	✓	✓	✓	The knowledge on industrial materials and environment will be applicable in regional, local, national and global aspects.
20	UGCHEMSEC01	Pharmacutical Chemistry	✓	✓	✓	✓	The knowledge on pharmacutical materials and environment will be applicable in regional, local, national and global aspects.
21	UGCHEMSEC02	Fuel Chemistry	✓	✓	✓	✓	The knowledge on fuel chemistry will be applicable in regional, local, national and global aspects.
22	UGCHEMGE01	Generic Elective 01	✓	✓	✓	✓	The knowledge on general chemistry will be applicable in regional, local, national and global aspects.
23	UGCHEMGE02	Generic Elective 02	✓	✓	✓	✓	The knowledge on general chemistry will be applicable in regional, local, national and global aspects.
24	UGCHEMGE03	Generic Elective 03	✓	✓	✓	✓	The knowledge on general chemistry will be applicable in regional, local, national and global aspects.

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Sl No	Course Code	Title of the course	Local	Regional	National	Global	Remarks
25	UGCHEMGE04	Generic Elective 04	✓	✓	✓	✓	The knowledge on general chemistry will be applicable in regional, local, national and global aspects.
26	UGCHEMAECC01	English for Communication	✓	✓	✓	✓	The knowledge on communicative english will develop personality as well as boost up confidence to represent them in different regional, local, national, global debates, discussions and meetings.
27	UGCHEMAECC02	Environmental Sciences	✓	✓	✓	✓	The knowledge on environmental sciences will aware the students for sustainable development of environment in the regional, local, national, global issues.

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PROGRAMME CODE	PGCHEM
PROGRAMME NAME	MSc. Chemistry

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Sl No	Course Code	Title of the course	Local	Regional	National	Global	Remarks
1	PGCHEMMCT01	Inorganic Chemistry 01	✓	✓	✓	✓	The knowledge on inorganic chemistry will be applicable in regional, local, national and global aspects.
2	PGCHEMMCT02	Organic Chemistry 01	✓	✓	✓	✓	The knowledge on organic chemistry will be applicable in regional, local, national and global aspects.
3	PGCHEMMCT03	Physical Chemistry 01	✓	✓	✓	✓	The knowledge on physical chemistry will be applicable in regional, local, national and global aspects.
4	PGCHEMMCP01	Inorganic Chemistry 01 Practical	✓	✓	✓	✓	The knowledge on inorganic chemistry practical will be applicable in regional, local, national and global aspects.
5	PGCHEMMCP02	Organic Chemistry 01 Practical	✓	✓	✓	✓	The knowledge on organic chemistry practical will be applicable in regional, local, national and global aspects.
6	PGCHEMMCP03	Physical Chemistry 01 Practical	✓	✓	✓	✓	The knowledge on physical chemistry practical will be applicable in regional, local, national and global aspects.
7	PGCHEMMCT04	Inorganic Chemistry 02	✓	✓	✓	✓	The knowledge on inorganic chemistry will be applicable in regional, local, national and global aspects.
8	PGCHEMMCT05	Organic Chemistry 02	✓	✓	✓	✓	The knowledge on organic chemistry will be applicable in regional, local, national and global aspects.
9	PGCHEMMCT06	Physical Chemistry 02	✓	✓	✓	✓	The knowledge on physical chemistry will be applicable in regional, local, national and global aspects.
10	PGCHEMMCP04	Inorganic Chemistry 02 Practical	✓	✓	✓	✓	The knowledge on inorganic chemistry practical will be applicable in regional, local, national and global aspects.
11	PGCHEMMCP05	Organic Chemistry 02 Practical	✓	✓	✓	✓	The knowledge on organic chemistry practical will be applicable in regional, local, national and global aspects.
12	PGCHEMMCP06	Physical Chemistry 02 Practical	✓	✓	✓	✓	The knowledge on physical chemistry practical will be applicable in regional, local, national and global aspects.

Sl No	Course Code	Title of the course	Local	Regional	National	Global	Remarks
13	PGCHEMMCT07	Inorganic Chemistry 03	✓	✓	✓	✓	The knowledge on inorganic chemistry will be applicable in regional, local, national and global aspects.
14	PGCHEMMCT08	Organic Chemistry 03	✓	✓	✓	✓	The knowledge on organic chemistry will be applicable in regional, local, national and global aspects.
15	PGCHEMMCT09	Physical Chemistry 03	✓	✓	✓	✓	The knowledge on physical chemistry will be applicable in regional, local, national and global aspects.
16	PGCHEMMCP07	Inorganic Chemistry 03 Practical	✓	✓	✓	✓	The knowledge on inorganic chemistry practical will be applicable in regional, local, national and global aspects.
17	PGCHEMMCP08	Organic Chemistry 03 Practical	✓	✓	✓	✓	The knowledge on organic chemistry practical will be applicable in regional, local, national and global aspects.
18	PGCHEMMCP09	Physical Chemistry 03 Practical	✓	✓	✓	✓	The knowledge on physical chemistry practical will be applicable in regional, local, national and global aspects.
19	PGCHEMSCC	Interdisciplinary Adv. Chemistry	✓	✓	✓	✓	The knowledge interdisciplinary chemistry will be applicable in regional, local, national and global aspects.
20	PGCHEMOE01	Supramolecular Chemistry	✓	✓	✓	✓	The knowledge on supramolecular chemistry will be applicable in regional, local, national and global aspects.
21	PGCHEMOE02	Medicinal Chemistry	✓	✓	✓	✓	The knowledge on medicinal chemistry will be applicable in regional, local, national and global aspects.
22	PGCHEMME01	Advanced Organic Chemistry 01	✓	✓	✓	✓	The knowledge on advanced organic chemistry will be applicable in regional, local, national and global aspects.
23	PGCHEMME02	Advanced Organic Chemistry 02	✓	✓	✓	✓	The knowledge on advanced organic chemistry will be applicable in regional, local, national and global aspects.
24	PGCHEMME03	Advanced Inorganic Chemistry 01	✓	✓	✓	✓	The knowledge on advanced inorganic chemistry will be applicable in regional, local, national and global aspects.

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Sl No	Course Code	Title of the course	Local	Regional	National	Global	Remarks
25	PGCHEMME04	Advanced Inorganic Chemistry 02	✓	✓	✓	✓	The knowledge on advanced inorganic chemistry will be applicable in regional, local, national and global aspects.
26	PGCHEMME05	Advanced Physical Chemistry 01	✓	✓	✓	✓	The knowledge on advanced physical chemistry will be applicable in regional, local, national and global aspects.
27	PGCHEMME06	Advanced Physical Chemistry 02	✓	✓	✓	✓	The knowledge on advanced physical chemistry will be applicable in regional, local, national and global aspects.
28	PGCHEMOT01	Project and Presentation	✓	✓	✓	✓	Project and presentation is very much important for application in regional, local, national and global aspects.
29	PGCHEMOT02	Grand Viva and Seminar	✓	✓	✓	✓	Grand viva and seminar is very much important for application in regional, local, national and global aspects.
30	PGCHEMSOC01	Yoga	✓	✓	✓	✓	Yoga is very much important for mental and physical development of students and thus it is widely acceptable in regional, local, national and global aspect
31	PGCHEMSOC02	Communicative English	✓	✓	✓	✓	Communicative english will enble students in personality development and thus it is widely acceptable in regional, local, national and global aspect
32	PGCHEMSOC03	VECC	✓	✓	✓	✓	VECC is very much important for mental development of students and thus it is widely acceptable in regional, local, national and global aspect
33	PGCHEMSOC04	Computer For Chemists	✓	✓	✓	✓	Computer for chemists will make students competent and thus it is widely acceptable in regional, local, national and global aspect

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B.Sc. Syllabus PHYSICS

1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global

Program Code	Program Name	Course Code	Course Name	Developmental Needs				Remarks
				Local	Regional	National	Global	
UGPHY	B. Sc. Physics	UGPHYCC01	Mathematical Physics - I		✓	✓	✓	1) Help syident to critically analyze socio-echonomic issues through mathematical models. 2) Help students of get score in National Level Exams. 3) Help to get chance in National as well as International level institutes.
UGPHY	B. Sc. Physics	UGPHYCC02	Mechanics		✓	✓	✓	1) Help students of get score in National Level Exams. 2) Help to get chance in National as well as International level institutes. 3) This course helps students to involve themselves in engineering (mechanical etc.) sectors.
UGPHY	B. Sc. Physics	UGPHYCC03	Electricity and Magnetism	✓	✓	✓	✓	1) Help students of get score in National Level Exams. 2) Help to get chance in National as well as International level institutes. 3) Helps students to involve themselves in engineering (electrical etc.) sectors.
UGPHY	B. Sc. Physics	UGPHYCC04	Waves and Optics	✓		✓	✓	1) Students will be able to connect with local science awarness programs (eg. eclipses, zero shadow day etc.). 2) Help students of get score in National Level Exams. 3) Help to get chance in National as well as International level institutes.
UGPHY	B. Sc. Physics	UGPHYCC05	Mathematical Physics - II		✓	✓	✓	1)Help students of get score in National Level Exams. 2) Help to get chance in National as well as International level institutes. 3) Help syident to critically analyze socio-echonomic issues through mathematical models.
UGPHY	B. Sc. Physics	UGPHYCC06	Thermal Physics		✓	✓	✓	1) Help students of get score in National Level Exams. 2) Help to get chance in National as well as International level institutes. 3) This course helps students to involve themselves in engineering sectors.
UGPHY	B. Sc. Physics	UGPHYCC07	Digital Systems and Applications	✓	✓	✓	✓	1) Help students of get score in National Level Exams. 2) Help to get chance in National as well as International level institutes. 3) This course helps students to involve themselves in engineering (electronics based) sectors.
UGPHY	B. Sc. Physics	UGPHYCC08	Mathematical Physics - III		✓	✓	✓	1) Help students of get score in National Level Exams. 2) Help to get chance in National as well as International level institutes. 3) Help syident to critically analyze socio-echonomic issues through mathematical models.

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Program Code	Program Name	Course Code	Course Name	Developmental Needs				Remarks
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UGPHY	B. Sc. Physics	UGPHYCC09	Elements of Modern Physics			✓	✓	1) Help students of get score in National Level Exams. 2) Help to get chance in National as well as International level institutes.
UGPHY	B. Sc. Physics	UGPHYCC10	Analog Systems and Applications	✓	✓	✓	✓	1) Help students of get score in National Level Exams. 2) Help to get chance in National as well as International level institutes. 3) This course helps students to involve themselves in engineering (electronics based) sectors.
UGPHY	B. Sc. Physics	UGPHYCC11	Quantum Mechanics and Applications			✓	✓	1) Help students of get score in National Level Exams. 2) Help to get chance in National as well as International level institutes.
UGPHY	B. Sc. Physics	UGPHYCC12	Solid State Physics		✓	✓	✓	1) Help students of get score in National Level Exams. 2) Help to get chance in National as well as International level institutes. 3) Help to get job as laboratory assistant in various academic institutes and commercial sectors.
UGPHY	B. Sc. Physics	UGPHYCC13	Electromagnetic Theory		✓	✓	✓	1) Help students of get score in National Level Exams. 2) Help to get chance in National as well as International level institutes. 3) Help to get job as laboratory assistant in various academic institutes and commercial sectors.
UGPHY	B. Sc. Physics	UGPHYCC14	Statistical Mechanics			✓	✓	1) Help students of get score in National Level Exams. 2) Help to get chance in National as well as International level institutes.
UGPHY	B. Sc. Physics	UGPHYDSE01	Advanced Mathematical Physics - I			✓	✓	1) Help students of get score in National Level Exams. 2) Help to get chance in National as well as International level institutes.
UGPHY	B. Sc. Physics	UGPHYDSE02	Advanced Dynamics			✓	✓	1) Help students of get score in National Level Exams. 2) Help to get chance in National as well as International level institutes.
UGPHY	B. Sc. Physics	UGPHYDSE03	Communication Electronics	✓	✓	✓	✓	1) Help students of get score in National Level Exams. 2) Help to get chance in National as well as International level institutes. 3) This course helps students to involve themselves in engineering (electronics based) sectors.
UGPHY	B. Sc. Physics	UGPHYDSE04	Advanced Mathematical Physics - II			✓	✓	1) Help students of get score in National Level Exams. 2) Help to get chance in National as well as International level institutes.
UGPHY	B. Sc. Physics	UGPHYDSE05	Nuclear and Particle Physics			✓	✓	1) Help students of get score in National Level Exams. 2) Help to get chance in National as well as International level institutes.

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Program Code	Program Name	Course Code	Course Name	Developmental Needs				Remarks
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UGPHY	B. Sc. Physics	UGPHYDSE06	Nano Materials and Applications		✓	✓	✓	1) Help students of get score in National Level Exams. 2) Help to get chance in National as well as International level institutes. 3) Help to get job as laboratory assistant in various academic institutes and commercial sectors.
UGPHY	B. Sc. Physics	UGPHYDSE07	Dissertation / Project work	✓	✓	✓	✓	1) Based on the project topic, students can involve themselves as an integral part in the fulfilment of local, regional, national and global needs.
UGPHY	B. Sc. Physics	UGPHYSEC01	Value Education and Indian Culture	✓	✓	✓	✓	1) Students will able to understand the educational needs, the power of thoughts and the Science of Peace. 2) They will attain awareness about the Indian Practice and Culture. 3) Acquire idea about Modern India: her hopes, challenges and Swami Vivekananda. Value Education
UGPHY	B. Sc. Physics	UGPHYSEC02	Spoken Tutorial			✓	✓	1) Students will acquire knowledge in extra curricula fields which help them to get score in institute of National and International importance.
UGPHY	B. Sc. Physics	UGPHYGE01	Mechanics		✓	✓	✓	1) Help students of get score in National Level Exams. 2) Help to get chance in National as well as International level institutes. 3) This course helps students to involve themselves in engineering (mechanical etc.) sectors.
UGPHY	B. Sc. Physics	UGPHYGE02	Thermal Physics and Statistical Mechanics		✓	✓	✓	1) Help students of get score in National Level Exams. 2) Help to get chance in National as well as International level institutes. 3) This course helps students to involve themselves in engineering sectors.
UGPHY	B. Sc. Physics	UGPHYGE03	Waves and Optics			✓	✓	1) Help students of get score in National Level Exams. 2) Help to get chance in National as well as International level institutes.
UGPHY	B. Sc. Physics	UGPHYGE04	Electricity and Magnetism	✓	✓	✓	✓	1) Help students of get score in National Level Exams. 2) Help to get chance in National as well as International level institutes. 3) Helps students to involve themselves in engineering (electrical etc.) sectors.

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UG MATHEMATICS, RKMVCC

1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global developmental needs

Program Code	Program Name	Course Code	Course Name	Developmental Needs				Rationale
				Local	Regional	National	Global	
UGMATH	B. Sc. Mathematics (Honours)	UGMATHCC01	Calculus, Geometry & Differential Equation & Practical				✓	Applications to the subjects are vast. Latest advanced references are also needed.
UGMATH	B. Sc. Mathematics (Honours)	UGMATHCC02	Algebra & Tutorial			✓	✓	Standard text book for algebra in global scenario is needed to get into depth of the related topics.
UGMATH	B. Sc. Mathematics (Honours)	UGMATHCC03	Real Analysis & Practical				✓	Incorporate the need of basic knowledge and recent developments in pure mathematics
UGMATH	B. Sc. Mathematics (Honours)	UGMATHCC04	Differential Equations & Vector Calculus & Practical		✓	✓	✓	Application oriented problems need to be taken into consideration
UGMATH	B. Sc. Mathematics (Honours)	UGMATHCC05	Theory of Real Functions & Introduction to Metric Spaces& Tutorial			✓		Study of real functions is the main object of study of calculus and, more generally, real analysis.
UGMATH	B. Sc. Mathematics (Honours)	UGMATHCC06	Group Theory I & Tutorial				✓	The subject has multidisciplinary significance.
UGMATH	B. Sc. Mathematics (Honours)	UGMATHCC07	Numerical Methods	✓		✓	✓	Keeping in view the vast need of the subject and for better foundation, less significant topics were removed
UGMATH	B. Sc. Mathematics (Honours)	UGMATHCC08	Riemann Integration and Series of Functions			✓		Along with analytic properties of sequences and real functions, it includes the study of limits and convergence of real-number sequences, which have vide applications.
UGMATH	B. Sc. Mathematics (Honours)	UGMATHCC09	Multivariate Calculus			✓		In engineering application, volume integral made a vital role so the importance of triple integral is insisted.
UGMATH	B. Sc. Mathematics (Honours)	UGMATHCC10	Ring Theory and Linear Algebra I			✓		To clear SET/NET examination
UGMATH	B. Sc. Mathematics (Honours)	UGMATHCC11	Partial Differential Equations and Applications & Practical	✓	✓		✓	Applications of PDE and integral transforms are wide in science and engineering. So advance topics are included.
UGMATH	B. Sc. Mathematics (Honours)	UGMATHCC12	Group Theory II & Tutorial				✓	Recent references needed
UGMATH	B. Sc. Mathematics (Honours)	UGMATHCC13	Metric Spaces and Complex Analysis & Tutorial				✓	For consecutive learning with applications.
UGMATH	B. Sc. Mathematics (Honours)	UGMATHCC14	Ring Theory and Linear Algebra II & Tutorial			✓		To clear SET/NET examination
UGMATH	B. Sc. Mathematics (Honours)	UGMATHDSE01	Linear Programming & Tutorial	✓			✓	Need for more research and projects.
UGMATH	B. Sc. Mathematics (Honours)	UGMATHDSE02	Probability and Statistics & Tutorial	✓	✓	✓		Changes with respect to certain parameter are necessary for the application oriented problems.
UGMATH	B. Sc. Mathematics (Honours)	UGMATHDSE03	Mechanics & Tutorial			✓		Areas of recent research and projects.

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Program Code	Program Name	Course Code	Course Name	Developmental Needs				Rationale
				Local	Regional	National	Global	
UGMATH	B. Sc. Mathematics (Honours)	UGMATHDSE04	Bio Mathematics & Practical	✓			✓	The Bio Mathematics has both theatrical and practical applications in research on biological, biomedical and biotechnological fields.
UGMATH	B. Sc. Mathematics (Honours)	UGMATHDSE05	Point Set Topology & Tutorial			✓		For better understanding of the fundamental concepts of continuity, compactness, and connectedness.
UGMATH	B. Sc. Mathematics (Honours)	UGMATHSEC01	Logic and Sets			✓		To undersatnd the basic concepts
UGMATH	B. Sc. Mathematics (General)	UGMATHGE01	Algebra & Tutorial			✓		To get more depth in basic topics.
UGMATH	B. Sc. Mathematics (General)	UGMATHGE02	Calculus, Geometry and Differential Equation & Tutorial				✓	Applications to the subjects are vast. Latest advanced references are also needed.
UGMATH	B. Sc. Mathematics (General)	UGMATHGE03	Numerical Methods & Tutorial	✓	✓		✓	Keeping in view the vast need of the subject and for better foundation, less significant topics were removed.
UGMATH	B. Sc. Mathematics (General)	UGMATHGE04	Group Theory & Tutorial				✓	Simple and foundational understanding.

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PG MATHEMATICS, RKMVCC

1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global developmental needs

Sl No	Program Name	Course Code	Course Name	Developmental Needs				Rationale
				Local	Regional	National	Global	
1	M. Sc. Mathematics	PGMATHCC101	Algebra-I				✓	Standard text book for algebra in global scenario is needed to get into depth of the related topics.
2	M. Sc. Mathematics	PGMATHCC102	Real Analysis				✓	Basic knowledge and recent development.
3	M. Sc. Mathematics	PGMATHCC103	Complex Analysis				✓	For consecutive learning with applications.
4	M. Sc. Mathematics	PGMATHCC104	Ordinary & Partial Differential Equations	✓		✓		Applications of ODE and PDE are wide in science and engineering. Method of separation of variable is a higher level of solving method and it has a application in heat and wave equation.
5	M. Sc. Mathematics	PGMATHCC105	Numerical Analysis		✓		✓	Find applications in real world problems
6	M. Sc. Mathematics	PGMATHCC106	Computer Programming in C++ and Numerical Practical using GNU Octave/Scilab /Matlab	✓	✓		✓	The revised syllabus provides the practical exposure on basic computer skills, program writing on basic local, global and national needs.
7	M. Sc. Mathematics	PGMATHSS01	YOGA	✓	✓	✓	✓	to gain strength and stamina so that the mind and body works together
8	M. Sc. Mathematics	PGMATHCC201	Algebra-II				✓	Standard text book for algebra in global scenario is needed to get into depth of the related topics.
9	M. Sc. Mathematics	PGMATHCC202	Measure and Integration				✓	Simple and foundational understanding.
10	M. Sc. Mathematics	PGMATHCC203	General Topology				✓	Advanced reference is needed.
11	M. Sc. Mathematics	PGMATHCC204	Classical Mechanics & Theory of Relativity				✓	Based on CSIR-_NET syllabus. Help the students to prepare GATE- JEST Exams
12	M. Sc. Mathematics	PGMATHCC205	Linear Algebra & Multivariate Calculus				✓	To get qualified in NET/SET examination
13	M. Sc. Mathematics	PGMATHCC206	Integral transforms and Integral Equations				✓	Application of Laplace transforms are vast.
14	M. Sc. Mathematics	PGMATHSS02	Communicative English	✓	✓	✓	✓	It is a powerful tool that can be used for business, travel or simply to have a conversation in a different country.
15	M. Sc. Mathematics	PGMATHCC301	Functional Analysis				✓	Strong knowlwege of the subject helps to investigate the properties of large classes of equations only by looking at some operators.
16	M. Sc. Mathematics	PGMATHCC302	Dynamical System Analysis				✓	Advanced reference is needed.
17	M. Sc. Mathematics	PGMATHCE301	Advanced Real Analysis-I				✓	For the knowledge of recent developments in pure mathematics
18	M. Sc. Mathematics	PGMATHCE302	Advanced Complex Analysis-I				✓	For consecutive learning with applications.
19	M. Sc. Mathematics	PGMATHCE303	Algebraic Topology-I				✓	Advanced reference is needed.
20	M. Sc. Mathematics	PGMATHCE304	Differential Manifold-I				✓	Advanced reference is needed.
21	M. Sc. Mathematics	PGMATHCE305	Cosmology-I				✓	It is valuable in itself for what it reveals about the nature of the cosmos we inhabit.
22	M. Sc. Mathematics	PGMATHCE306	Mathematical Biology-I	✓	✓	✓	✓	Mathematics combined with biology has both theatrical and practical applications in research on biological, biomedical and biotechnological fields.
23	M. Sc. Mathematics	PGMATHCE307	Operation Research-I	✓			✓	Latest reference needed for higher level concepts.
24	M. Sc. Mathematics	PGMATHCE308	Continuum Mechanics(Solid)-I				✓	Large scope of research and projects.
25	M. Sc. Mathematics	PGMATHAE301	Programming in PYTHON & LaTex	✓	✓	✓	✓	To develop GUI applications, websites and web applications in IOT devices. Skill development for research project and application were added.
26	M. Sc. Mathematics	PGMATHSS03	VE & IC				✓	Advanced reference is needed.

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Sl No	Program Name	Course Code	Course Name	Developmental Needs				Rationale
				Local	Regional	National	Global	
27	M. Sc. Mathematics	PGMATHCC401	Number theory				✓	To highlight the nuances in the world of numbers.
28	M. Sc. Mathematics	PGMATHCC402	Discrete Mathematics				✓	Need of computer science
29	M. Sc. Mathematics	PGMATHCE401	Advanced Real Analysis-II				✓	For the knowledge of recent developments in pure mathematics
30	M. Sc. Mathematics	PGMATHCE402	Advanced Complex Analysis-II				✓	For consecutive learning with applications.
31	M. Sc. Mathematics	PGMATHCE403	Algebraic Topology-II				✓	Advanced reference is needed.
32	M. Sc. Mathematics	PGMATHCE404	Differential Manifold-II				✓	Advanced reference is needed.
33	M. Sc. Mathematics	PGMATHCE405	Cosmology-II				✓	It is valuable in itself for what it reveals about the nature of the cosmos we inhabit.
34	M. Sc. Mathematics	PGMATHCE406	Mathematical Biology-II	✓	✓		✓	Mathematics combined with biology has both theatrical and practical applications in research on biological, biomedical and biotechnological fields.
35	M. Sc. Mathematics	PGMATHCE407	Operation Research-II			✓	✓	Latest reference needed for higher level concepts.
36	M. Sc. Mathematics	PGMATHCE408	Continuum Mechanics(Fluid)-II				✓	Large scope of research and projects.
37	M. Sc. Mathematics	PGMATHCC403	Project Work** (Viva Voce + Dissertation)	✓	✓	✓	✓	For overall development of the learner about the subject.
38	M. Sc. Mathematics	PGMATHSS04	Seminar Presentation	✓	✓	✓	✓	For the development of strong communication skill and confidence to withstand today's competetive world.

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Programme Code	UGMCB
Programme name	Microbiology (Honours)

Sl no	Course code	Title of the course	Local	Regional	National	Global	Remarks
1	UGMCBCC01	Introduction to Microbiology and Microbial Diversity	✓	✓	✓	✓	Basic concepts on Microbial world and its diversity helps students to apply them in local, regional, national and global situations.
2	UGMCBCC02	Bacteriology	✓	✓	✓	✓	Fundamental knowledge of bacterial cell-structure,organisation,nutrition and taxonomy with special emphasis on microbiological techniques and microscopy has relevance in all four situations
3	UGMCBCC03	Biochemistry			✓	✓	Analytical biochemistry of microbial system develops skill and will be helpful in research work in National and global scenario
4	UGMCBCC04	Virology		✓	✓	✓	Overview of medically important virus families, their transmission and replication strategies with attention to Oncogenic Viruses and prevention of viral diseases has applicability in wide range of scenario.
5	UGMCBCC05	Microbial Physiology and Metabolism		✓	✓	✓	Concepts of microbial physiology and their metabolism procedures will help students to understand how the microbes survive and derived energy in different environmental conditions.
6	UGMCBCC06	Cell Biology			✓	✓	Exploring the ideas on cell signaling and regulation along with proteomics and apoptosis are helpful for the drug delivery and various realated molecular research, which have national and global relevance.

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Sl no	Course code	Title of the course	Local	Regional	National	Global	Remarks
7	UGMCBCC07	Molecular Biology			✓	✓	Explicit theoretical and practical knowledge of molecular biology will enrich students at National and Global levels of research and employment.
8	UGMCBCC08	Microbial Genetics			✓	✓	Detailed understanding of microbial genome organisation with emphasis on microbial genetic exchange and transposons are important in national and global perspectives.
9	UGMCBCC09	Environmental Microbiology	✓	✓	✓	✓	Ideas on biogeochemical cycles, microbiome, bioremediation, pollution control and sustainable development have practical applications in local, regional, national and global environmental modeling.
10	UGMCBCC10	Food and Dairy Microbiology	✓	✓	✓	✓	This delivers a detailed insight about the food pathogens, control measure, dairy starter and food fermentation process, which could be applied in every aspect of life.
11	UGMCBCC11	Industrial Microbiology		✓	✓	✓	Large scale industrial application of the concept will enable to apply in related industrial farms in various locations and global acceptibility.
12	UGMCBCC12	Immunology	✓	✓	✓	✓	Students could use their knowledge in different situations to help common people as well as they have convincing job and research opportunity
13	UGMCBCC13	Medical Microbiology	✓	✓	✓	✓	Pathogenic infection and disease management and its understanding are useful in all scenario

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Sl no	Course code	Title of the course	Local	Regional	National	Global	Remarks
14	UGMCBCC14	Recombinant DNA Technology			✓	✓	Acquaints the students to versatile tools and techniques employed in genetic engineering and recombinant DNA technology. Basic concepts and experimental knowledge on genetic engineering help students to flourish in professional as well as academic carriers in bigger perspectives.
15	UGMCBDSE01	Inheritance Biology		✓	✓	✓	It presents the fundamentals of microbial and human genetics, includes Mendelian principles and physical basis of inheritance, mechanisms of inheritance, chromosomal structure, abnormalities and recombination with brief discussion on Human molecular genetics and polygenic inheritance. These fundamental knowledge has immense application in regional to global perspectives.
16	UGMCBDSE02	Microbial Biotechnology		✓	✓	✓	Students could explore the wide array of this field and apply it for betterment of mankind as well as of environments from local to global perspectives.
17	UGMCBDSE03	Project Work	✓	✓	✓	✓	Students should complete an independent review project, demonstrate knowledge of current research and skill of using current tools and techniques specific to the professional field of study. Depending on the field chosen it can have local to global application.
18	UGMCBDSE04	Instrumentation and Biotechniques		✓	✓	✓	Regional to global applications of biophysics and its principles are involved in bioinstruments with description of their methodology and applications.

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Sl no	Course code	Title of the course	Local	Regional	National	Global	Remarks
19	UGMCBDSE05	Advances in Microbiology			✓	✓	Metagenomic analysis and evolution of pathogen have immense implication in future disease management and researches.
20	UGMCBSEC01	Value Education & Indian Culture	✓	✓	✓	✓	Aplicable everywhere
21	UGMCBSEC02	ONLINE COURSE	✓	✓	✓	✓	The online Cell Designer practice helps in the drawing of gene-regulatory and biochemical networks for illustration support which have local to global applications.
22	UGMCBGE01	Bacteriology and Virology		✓	✓	✓	Basic concepts on Bacteria and virus helps students to apply them in regional, national and global scenario.
23	UGMCBGE02	Microbes in Environment	✓	✓	✓	✓	Ideas on biogeochemical cycles, microbiome, bioremediation, pollution control and sustainable development have practical applications in local, regional, national and global environmental modeling.
24	UGMCBGE03	Industrial & Food Microbiology	✓	✓	✓	✓	This delivers a detailed insight about the food pathogens, control measure, dairy starter and food fermentation process, which could be applied in every aspect of life. Large scale industrial application of the concept will enable to apply in related industrial farms in various locations.
25	UGMCBGE04	Genetic Engineering and Biotechnology			✓	✓	Acquaints the students to versatile tools and techniques employed in genetic engineering and recombinant DNA technology. Basic concepts and experimental knowledge on genetic engineering help students to flourish in professional as well as academic carriers in bigger perspectives.

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Sl no	Course code	Title of the course	Local	Regional	National	Global	Remarks
26	UGMCBGE05	Microbial Genetics and Molecular Biology			✓	✓	Explicit theoretical and practical knowledge of molecular biology will enrich students at National and Global levels of research and employment. Emphasis on microbial genetic exchange and transposons are important in national and global perspectives.

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B.Sc. Syllabus Zoology (Hons)

Course code	Title of the Course	Need				Remarks
		Local	Regional	National	Global	
UGZOOCC01	Non-chordates I: Protists to pseudocoelomates	✓	✓	✓	✓	Remembers, understands and apply the basic taxonomy, systematics and classification of Protozoa, Porifera, Cnidaria and Helminth groups, including Nematode- Plant interaction. Understand, apply and analyse the identification of invertebrate specimens and their life stages.
UGZOOCC02	Principles of ecology	✓	✓	✓	✓	Understand and evaluate the components of ecosystem, nutrient and biogeochemical cycles and impact of man on the ecological balance. Understand and evaluate the importance of biodiversity and its conservation.
UGZOOCC03	Non-chordates II: coelomates	✓	✓	✓	✓	Remembers and understands the classification of coelomate invertebrates and the structure, functional biology of these taxonomic categories. Understand and evaluate different vector born diseases and the related life cycles, epidemiology, pathology, diagnosis, symptoms and treatments.
UGZOOCC04	Cell biology			✓	✓	Outline the structures and explain the functions of plasma membrane and all cellular organelles in details. Acquire knowledge about chromosomes and cell divisions, both mitosis and meiosis.
UGZOOCC05	Diversity of chordates	✓	✓	✓	✓	Understand the classification, structure, function and biology of chordates of different taxonomic classes. Outline the origin of chordates. Explain some special topics like zoogeography, metamorphosis, snake bites, migration of birds, parental care of amphibian, echolocation of mammals.

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Course code	Title of the Course	Need				Remarks
		Local	Regional	National	Global	
UGZOOCC06	Animal physiology: Controlling and coordinating systems		✓	✓	✓	Explain the reproductive systems and distinguish the physiology of male and female reproduction. Understand and evaluate the histology of endocrine glands and classify hormones, demonstrate their biosynthesis, receptors, mode of molecular actions, physiological function, feedback controls and related disorders.
UGZOOCC07	Fundamentals of biochemistry			✓	✓	Remembers, understands the basic and fundamental biochemistry of carbohydrates, proteins, lipids and nucleic acids. Learn some instrumentation such as microscopy, chromatography, electrophoresis, centrifugation, spectrophotometry etc.
UGZOOCC08	Comparative anatomy of vertebrates	✓	✓	✓		Define and understand the structures of different systems such as, integumentary, skeletal, digestive, respiratory, circulatory, urinogenital, nervous and sensory organs in comparative way among the vertebrate groups.
UGZOOCC09	Animal physiology: Life sustaining systems			✓	✓	Learn the physiology of digestion, absorptions and hormonal control of enzyme secretion. Examine the histology of different tissue, ABO Blood group, red blood cells, white blood, haemoglobin and blood pressure
UGZOOCC10	Biochemistry of metabolic processes			✓	✓	Remember and understand the basics mechanisms and pathway of Metabolism.
UGZOOCC11	Molecular biology		✓	✓	✓	Elaborate various molecular tools and techniques like PCR, southern, northern and western blotting, recombinant DNA technology etc. Learn various tools and techniques related to bacterial microbiology, some aspects of applied microbiology and diseases related to microbiology.

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Course code	Title of the Course	Need				Remarks
		Local	Regional	National	Global	
UGZOOCC12	PRINCIPLES OF GENETICS	✓	✓	✓	✓	Understand the sex determination of various animals, extrachromosomal inheritances, transposable genetic elements etc. Understand various aspects of human genetics by covering chromosomal aberrations, gene mutation, etc..
UGZOOCC13	Developmental biology		✓	✓	✓	Aquire knowledge about implications of developmental biology in various fields, such as in teratogenesis, stem cell biology, in vitro fertilization, cryopreservation, cord blood transfusion etc.
UGZOOCC14	Evolutionary biology		✓	✓		Learn various evolutionary concepts and historical perspective about evolution. Understand the population genetics and evaluate the evolutionary forces and its impact.
UGZOODSE_1	Immunology		✓	✓	✓	Remembers, understands the structures and function of immune cells, immunoglobulins, antigens and their interactions with antibodies. Understand the MHC molecules, cytokines, hyper sensitivity reactions and cellular mode of immunity development.
UGZOODSE_2A	Animal behaviour and chronobiology	✓	✓	✓		Remembers, understands the details about patterns of behaviours, survival strategies, social and cooperative behaviours. Understand nesting habits of animals, analyse the ethogram and prepare a short report on behavioural activities of animals
UGZOODSE_2B	Pollination biology	✓	✓	✓		Understand and evaluate know about the basic principle and modes of pollination, types and identification of flower visitors, pollinator diseases, colour vision capabilities of insect pollinators.
UGZOODSE_2C	Project work	✓	✓	✓		Remember and understand the basic concepts in bioinformatics and molecular biology. Apply various bioinformatics tools to analyse various biological data.

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Course code	Title of the Course	Need				Remarks
		Local	Regional	National	Global	
UGZOODSE_3	Biodiversity and wild life conservation	✓	✓	✓	✓	Remembers, understands the various issues related to biodiversity loss and conservation as well as status, conditions and conservation of forests and wildlife.
UGZOODSE_4	Computational biology			✓	✓	Understand, evaluate and use the biological databases to retrieve biological data. Understand and apply the Bioinformatics and biostatistics
UGZOOGE 1	Animal diversity and systems			✓	✓	Remembers the general characters and special features in different animal groups. Understands and apply the taxonomy and classifications of animals.
UGZOOGE 2	Ecology, economic and medical zoology	✓	✓	✓		Remembers, understands and apply the definition, principle and scope of fisheries and aquaculture, lac culture and pest management.
UGZOOGE 3	Biotechnology: microbes to animals		✓	✓	✓	Understand and evaluate the techniques in gene manipulation. Understand and evaluate the application of microbes in biotechnology.
UGZOOGE 4	Insect, vectors and diseases	✓	✓	✓		Understand, identify and analyse different vectors and their associated diseases.
UGZOOSEC_1	Value education & indian culture	✓	✓	✓	✓	Attain awareness about daily routine, self-evaluation & Integral Personality Development
UGZOOSEC_2	Spoken Tutorial from IIT Bombay		✓	✓	✓	Understand various aspects of CellDesigner system
UGZOOAECC01	English	✓	✓	✓	✓	Demonstrate mastery of the discipline by detailing the development and current practices of Listening, Speaking, Reading and Writing as Language skills.
UGZOOAECC02	Environmental Science	✓	✓	✓	✓	Remembers and understands the concept, components and function of natural resources and ecosystems.

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Programme Code: PGZOO, Programme name: M.Sc. Zoology							
Sl. No.	Course code	Title of the Course	Need				Remarks
			Local	Regional	National	Global	
1	PGZOOCC 1.1T	Diversity and biology of Nonchordates	✓	✓	✓	✓	The students understand and evaluate the adaptive radiation, evolution, affinities of a variety of invertebrates species available in the local environment and all over the globe. They also learn and evaluate invertebrate defence and feeding mechanisms, the biological and medicinal importance of various larvae and sponges respectively wich are also relevant in this regards.
2	PGZOOCC 1.2T	Diversity and biology of Chordates	✓	✓	✓	✓	Understand and analyse the Skeletal system and its functional and evolutionary significance of a variety of vertebrates species, discuss structural adaptation of different vertebrates available in the local environment and all over the globe.
3	PGZOOCC 1.3T	Cell biology & Instrumentations	✓	✓	✓	✓	The students understand and evaluate buffer systems and apply centrifugation, spectrophotometry, electrophoresis & bloating and microscopy. This methods and technologies are very useful in local, regional, national and global context.
4	PGZOOCC 1.4T	Genetics	✓	✓	✓		The study of mendelian inheritance, human karyotyping & chromosomal disorders and pedigree analysis can be employed to study local, regional and national inheritance patterns of diseases and traits.
5	PGZOOCC 1.5P	Structures & systems of organisms	✓	✓	✓	✓	The students will apply the knowledge of hypophysation technique, aquaculture firm operation in local, regional and national level. Evaluate various organ and systems in selected invertebrates and vertebrates and correlate the structure and function of organs in animals available all over the globe.

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Sl. No.	Course code	Title of the Course	Need				Remarks
			Local	Regional	National	Global	
6	PGZOOCC 1.6P	Tools & techniques in biological study	✓	✓	✓	✓	The students learn spectrophotometric techniques to estimate protein and nucleic acids, analyse the adulteration, survey of Mendelian traits, analyse the pedigree, and preparation, purification and gel ectrophoresis of DNA. All the techniquecs are very much relevant to all these context.
7	PGZOOSOC 1	Yoga	✓	✓	✓	✓	Students learn general awareness about health, how to manage life style, increase concentration, Improve the decision-making capacity.
8	PGZOOCC 2.1T	Biochemistry & Metabolism		✓	✓	✓	Knowledge of biochemical components and metabolisms, application of law of thermodynamics in biophysical chemistry, the synthesis of fatty acids and nucleic acids help students in analytical studies.
9	PGZOOCC 2.2T	Molecular biology & Biotechnology		✓	✓	✓	Knowledge of different genetic engineering tools, cancer formation and access the role of carcinogens, transgenic organisms production and ethical issues, gene regulation, gene silencing and non-coding RNAs interference for drug development help students in analytical studies and in applied science at regional, National and global level.
10	PGZOOCC 2.3T	Ethology & chronobiology	✓	✓	✓	✓	Students analyse the social organization and the communications in animals, and apply the animal's communications system in resource exploration in local, regional and national level and discuss the significance at global level.
11	PGZOOCC 2.4T	Ecological sciences	✓	✓	✓		Define, Demonstrate and analyse the population, community ecology and evaluate the riverine ecosystem and its management at local, regional and National level.

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Sl. No.	Course code	Title of the Course	Need				Remarks
			Local	Regional	National	Global	
12	PGZOOCC 2.5P	Biochemical and molecular aspects of life	✓	✓	✓	✓	Knowledge of different biochemical analysis, Spectrofluorimetric technique, gene cloning and gene expression, cell culture lab protocols and DNA sequencing help students to be placed in research centers at local, national, regional and global levels.
13	PGZOOCC 2.6P	Ethology & Ecology	✓	✓	✓	✓	The evaluation of behaviour in fishes and birds, performing toxicity, physicochemical parameters of water and soil test help to solve various ecological problems at local, regional and national level.
14	PGZOOSOC 2	Communicative English	✓	✓	✓	✓	Enhance their English language proficiency in the aspects of reading, writing, listening and speaking.
15	PGZOOCC 3.1T	Parasitology and Immunology	✓	✓	✓	✓	The knowledge of the parasites detection, diagnosis, prophylaxis and host parasite interactions, immunological mechanisms of infectious and noncommunicable disease formation allows them to be engaed in future research and to get job in dignostic lab at all these levels.
16	PGZOOCC 3.2T	Developmental biology and Neurobiology		✓	✓	✓	The knowledge on the cellular and molecular aspects of regenerative biology and stem cell, brain aging and various neuropathological diseases allows the students to take research at regional, national and global level.
17	PGZOOCC 3.3T	Endocrine physiology		✓	✓	✓	The knowledge on role of hormone in cancers, endocrine disorders, stress and obesity disorders and the reproductive disorders for endocrine disruptions allows the students to take research at regional, national and global level.
18	PGZOOEC 3.4T-1	Elective paper - Entomology	✓	✓	✓		The knowledge on the application of social insects helps the students to be engaged in apiculture, sericulture, and lac culture al local, regional and national level.

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Sl. No.	Course code	Title of the Course	Need				Remarks
			Local	Regional	National	Global	
19	PGZOOEC 3.4T-2	Elective paper-Cellular and Molecular Biology		✓	✓	✓	The knowledge on the cellular organization, cell division and cell cycle, essentials ideas of molecular biology, tools and techniques in molecular biology and tools for genetic engineering allows the students to take research at regional, national and global level.
20	PGZOOCC 3.5P	Immunology, Parasitology, Developmental biology & Endocrinology			✓	✓	The knowledge of preparation of microtome procedure, stains, fixatives, culture media for parasites, and their spot identifications, blood smear examination and bioassays allows the students to gate jobs at local, regional and national level and to take part in research at regional, national and global level.
21	PGZOOEC 3.6P-1	Dissertation and practical of elective paper - Entomology	✓	✓	✓	✓	The knowledge on the application of social insects helps the students to be engaged in apiculture, sericulture, and lac culture al local, regional and national level. The knowledge on design and perform original research work in entomology allows the students to take research at regional, national and global level.
22	PGZOOEC 3.6P-2	Dissertation and practical of elective paper - Cellular and Molecular Biology	✓	✓	✓	✓	The knowledge of DNA and protein isolation and visualization, bacterial culture and plasmid DNA preparation, PCR primer designing and design and perform original research work using molecular biology techniques allows the students to take research at regional, national and global level.
23	PGZOOSOC 3	Value Education and Indian Culture	✓	✓	✓	✓	The knowledge and practice of daily routine, self-evaluation & Integral Personality Development help them to be accustom with the work environment at local, regional, national and global level.

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Sl. No.	Course code	Title of the Course	Need				Remarks
			Local	Regional	National	Global	
24	PGZOOCC 4.1T	Taxonomy and Biostatistics		✓	✓	✓	The knowledge of the basic concepts in taxonomy & phylogenetics and biostatistics, evaluate the descriptive statistics and diagrammatic representation of data, research methodologies, biological data analysis tools and techniques, machine learning in biological data analysis and representation enables the students to take research at regional, national and global level.
25	PGZOOCC 4.2T	Bioinformatics and Computational Biology		✓	✓	✓	The knowledge of basic concepts in Bioinformatics/Computational biology and its applications in various fields, biological databases, apply algorithms for the sequence alignment and computational calculations enables the students to take research at regional, national and global level.
26	PGZOOCC 4.3T	Bio python and LaTeX		✓	✓	✓	The knowledge of handling and analysis of nucleotide, protein sequences and databases, neural networks and genetic algorithms, Create and design documents in LaTeX enables the students to take research at regional, national and global level.
27	PGZOOEC 4.4T -1	Elective paper - Entomology	✓	✓	✓	✓	The knowledge on the application of insect biology in the field of agriculture, forest ecology, vector biology and forensic science helps the students to be engaged in these fields at local, regional and national level. Understand the global environmental impact on insects.
28	PGZOOEC 4.4T -2	Elective paper - Cellular and Molecular Biology	✓	✓	✓	✓	The knowledge on cellular metabolic disorders, the gene transfer and gene manipulation methodologies, tools and techniques in molecular biology viz. PCR, Cloning and various nucleotide sequencing techniques allows the students to take research at regional, national and global level.

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Sl. No.	Course code	Title of the Course	Need				Remarks
			Local	Regional	National	Global	
29	PGZOOCC 4.5P	Phylogenetics, Biostatistics and Bioinformatics			✓	✓	The knowledge of basic concepts in Bioinformatics/Computational biology and its applications in various fields, biological databases, apply algorithms for the sequence alignment and computational calculations enables the students to take research at regional, national and global level.
30	PGZOOEC 4.6P -1	Submission of final dissertation and practical of elective paper Entomology	✓	✓	✓		The knowledge on the application of social insects helps the students to be engaged in apiculture, sericulture, and lac culture at local, regional and national level. The knowledge on design and perform original research work in entomology allows the students to take research at regional, national and global level.
31	PGZOOEC 4.6P -2	Submission of final dissertation and practical of elective paper - Cellular and Molecular Biology		✓	✓	✓	The knowledge on the cellular organization, cell division and cell cycle, essentials ideas of molecular biology, tools and techniques in molecular biology and tools for genetic engineering and design, examine and interpret original research work using molecular biology techniques allows the students to take research at regional, national and global level.
32	PGZOOSOC 4	Fundamentals of remote sensing and GIS	✓	✓	✓	✓	The knowledge of basics of GIS and remote sensing and its application, basic Map preparation in ArcGIS, satellite data download and visualization enables the students to apply at local, regional, national and global level.

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Local / National / Regional / Global Relevance [Computer Science (Honours)]

Course Code	Title of the Course	Semester	Need				Remarks
			Local	National	Regional	Global	
UGCMS CC 1	Programming Fundamentals using C/C++: Theory & Lab	I	✓	✓	✓	✓	This course provides the basic logical and conceptual understanding of computer programming for application development with hands-on practical training of implementation. This skill has applicability in local, national, regional and global perspective.
UGCMS CC 2	Computer System Architecture: Theory & Lab	I	✓	✓	✓	✓	It provides the architectural details and knowledge with hands-on experiments of basic computer hardware. This skill has applicability in local, national, regional and global perspective.
UGCMS CC 3	Programming in JAVA: Theory & Lab	II	✓	✓	✓	✓	This is a skill has applicability in local, national, regional and global perspective which will provide the object oriented advanced logical and conceptual understanding of computer programming using Java for application development with hands-on practical training of implementation
UGCMS CC 4	Discrete Structures: Theory & Tutorial	II	✓	✓	✓	✓	This course gives the understanding of discrete mathemetical analysis of computing methods and logical operations of computing systems. This knowledge has prospect in local, national, regional and global scenario.
UGCMS CC 5	Data Structures: Theory & Lab	III	✓	✓	✓	✓	This course provides the understanding of the underlined structural and logical organisation of data for any computing system with hands-on practical training of implementation which has prospects in local, national, regional and also in global scenario.
UGCMS CC 6	Operating Systems: Theory & Lab	III	✓	✓	✓	✓	It gives the base knowledge of functionality and design aspects of operating system of any computing system with hands-on practical training which is needed in local, national, regional and global perspective.
UGCMS CC 7	Computer Networks: Theory & Lab	III	✓	✓	✓	✓	This course helps to understand the principals and functionalities of networking system of any computing environment with hands-on practical training. This has relevance in local, national, regional and global perspective.

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Local / National / Regional / Global Relevance [Computer Science (Honours)]

Course Code	Title of the Course	Semester	Need				Remarks
			Local	National	Regional	Global	
UGCMS SEC 1	Value Education	III	✓	✓	✓	✓	This course enrichs the human values and social ethics with the knowledge of our culture and heritage which has relevance in every aspect of life.
UGCMS CC 8	Design and Analysis of Algorithms: Theory & Lab	IV	✓	✓	✓	✓	It provides the understanding of the design aspects of algorithms and computational cost of algorithms for efficient development of softwares with hands-on practical training. It has very high prospect in local, national, regional and global perspective.
UGCMS CC 9	Software Engineering: Theory & Lab	IV	✓	✓	✓	✓	It provides the basic concept of systematic software development with hands-on practical training of implementation which has relevance in local, national, regional and global perspective.
UGCMS CC 10	Database Management Systems: Theory & Lab	IV	✓	✓	✓	✓	It gives the knowledge of the underlined structural and logical organisation of database system to efficiently handle large amount of information which has high relevance in local, national, regional and global perspective.
UGCMS SEC 2	Programming in Python	IV	✓	✓	✓	✓	This course provides the object oriented concepts of computer programming using Python for application development which has very high relevance in local, national, regional and global perspective.
UGCMS CC 11	Internet Technologies: Theory & Lab	V	✓	✓	✓	✓	It provides the base knowledge of functionality and design aspects of Internet and the technologies used to run the same with hands-on practical training. It has prospects in local, national, regional and global perspective.
UGCMS CC 12	Theory of Computation: Theory & Tutorial	V		✓	✓	✓	This course gives the understanding of the basic underlined structural and logical aspects of computational behaviours in different states of cognitive reasoning which is very relevant in national, regional and global perspective.
UGCMS DSE 1	Microprocessor: Theory & Lab	V		✓	✓	✓	This course provides the knowledge about the architectural details and functionality of processor with hands-on experiments which has prospects in national, regional and global perspective.

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Local / National / Regional / Global Relevance [Computer Science (Honours)]

Course Code	Title of the Course	Semester	Need				Remarks
			Local	National	Regional	Global	
UGCMS DES 2	Numerical Methods: Theory & Lab	V	✓	✓	✓	✓	It gives the knowledge of methemetical methods and computing mechanisms with hands-on practicals which has relevance in every academic region.
UGCMS DES 3	Cloud Computing: Theory & Lab	V	✓	✓	✓	✓	It provides the base knowledge of recent technologies of cloud based computing methods and functionalities which has very high importance in local, national, regional and global perspective.
UGCMS CC 13	Artificial Intelligence: Theory & Lab	VI	✓	✓	✓	✓	It gives the basic concept and recent developments of Artificial Intelligence algorithms with hands-on practical training which has very high relevance in local, national, regional and global perspective.
UGCMS CC 14	Computer Graphics: Theory & Lab	VI	✓	✓	✓	✓	This course provides the basic concept of graphical representation of computing outcomes along with graphical user interfaces, methods, applications and developments which has relevance in local, national, regional and global perspective.
UGCMS DSE 4	Machine Learning: Theory & Lab	VI	✓	✓	✓	✓	It gives the understanding of the basics concept and recent developments of Machine Learning algorithms with hands-on practical training having relevance in local, national, regional and global perspective.
UGCMS DSE 5	Data Mining: Theory & Lab	VI	✓	✓	✓	✓	The course gives the basics concept and implementaion of different Machine Learning algorithms to handle varieties of data with hands-on practical training which has very high relevance in local, national, regional and global perspective.
UGCMS DSE 6	Dissertation or Project work	VI	✓	✓	✓	✓	It enables students to take the responsibility to complete a research oriented challenging task inside a given time frame, to work in a collaborative environment which is very high relevant in local, national, regional and global perspective.

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PROGRAMME CODE	UGCHEM
PROGRAMME NAME	BSc. Chemistry Honours

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Sl No	Course Code	Title of the course	Local	Regional	National	Global	Remarks
1	UGCHEMCC01	Organic Chemistry 01	✓	✓	✓	✓	The knowledge on organic chemistry will be applicable in regional, local, national and global aspects.
2	UGCHEMCC02	Physical Chemistry 01	✓	✓	✓	✓	The knowledge on physical chemistry will be applicable in regional, local, national and global aspects.
3	UGCHEMCC03	Inorganic Chemistry 01	✓	✓	✓	✓	The knowledge on inorganic chemistry will be applicable in regional, local, national and global aspects.
4	UGCHEMCC04	Organic Chemistry 02	✓	✓	✓	✓	The knowledge on organic chemistry will be applicable in regional, local, national and global aspects.
5	UGCHEMCC05	Physical Chemistry 02	✓	✓	✓	✓	The knowledge on physical chemistry will be applicable in regional, local, national and global aspects.
6	UGCHEMCC06	Inorganic Chemistry 02	✓	✓	✓	✓	The knowledge on inorganic chemistry will be applicable in regional, local, national and global aspects.
7	UGCHEMCC07	Organic Chemistry 03	✓	✓	✓	✓	The knowledge on organic chemistry will be applicable in regional, local, national and global aspects.
8	UGCHEMCC08	Physical Chemistry 03	✓	✓	✓	✓	The knowledge on physical chemistry will be applicable in regional, local, national and global aspects.
9	UGCHEMCC09	Inorganic Chemistry 03	✓	✓	✓	✓	The knowledge on inorganic chemistry will be applicable in regional, local, national and global aspects.
10	UGCHEMCC10	Organic Chemistry 04	✓	✓	✓	✓	The knowledge on organic chemistry will be applicable in regional, local, national and global aspects.
11	UGCHEMCC11	Inorganic Chemistry 04	✓	✓	✓	✓	The knowledge on inorganic chemistry will be applicable in regional, local, national and global aspects.
12	UGCHEMCC12	Organic Chemistry 05	✓	✓	✓	✓	The knowledge on organic chemistry will be applicable in regional, local, national and global aspects.

Sl No	Course Code	Title of the course	Local	Regional	National	Global	Remarks
13	UGCHEMCC13	Inorganic Chemistry 05	✓	✓	✓	✓	The knowledge on inorganic chemistry will be applicable in regional, local, national and global aspects.
14	UGCHEMCC14	Physical Chemistry 04	✓	✓	✓	✓	The knowledge on physical chemistry will be applicable in regional, local, national and global aspects.
15	UGCHEMDSE01	Advanced Physical Chemistry	✓	✓	✓	✓	The knowledge on advanced physical chemistry will be applicable in regional, local, national and global aspects.
16	UGCHEMDSE02	Analytical Methods of Chemistry	✓	✓	✓	✓	The knowledge on analytical chemistry will be applicable in regional, local, national and global aspects.
17	UGCHEMDSE03	Green Chemistry	✓	✓	✓	✓	The knowledge on green chemistry will be applicable in regional, local, national and global aspects.
18	UGCHEMDSE04	Inorganic Materials of Industrial Importance	✓	✓	✓	✓	The knowledge on industrially important inorganic materials will be applicable in regional, local, national and global aspects.
19	UGCHEMDSE05	Industrial Chemicals and Environment	✓	✓	✓	✓	The knowledge on industrial materials and environment will be applicable in regional, local, national and global aspects.
20	UGCHEMSEC01	Pharmacutical Chemistry	✓	✓	✓	✓	The knowledge on pharmacutical materials and environment will be applicable in regional, local, national and global aspects.
21	UGCHEMSEC02	Fuel Chemistry	✓	✓	✓	✓	The knowledge on fuel chemistry will be applicable in regional, local, national and global aspects.
22	UGCHEMGE01	Generic Elective 01	✓	✓	✓	✓	The knowledge on general chemistry will be applicable in regional, local, national and global aspects.
23	UGCHEMGE02	Generic Elective 02	✓	✓	✓	✓	The knowledge on general chemistry will be applicable in regional, local, national and global aspects.
24	UGCHEMGE03	Generic Elective 03	✓	✓	✓	✓	The knowledge on general chemistry will be applicable in regional, local, national and global aspects.

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25	UGCHEMGE04	Generic Elective 04	✓	✓	✓	✓	The knowledge on general chemistry will be applicable in regional, local, national and global aspects.
26	UGCHEMAECC01	English for Communication	✓	✓	✓	✓	The knowledge on communicative english will develop personality as well as boost up confidence to represent them in different regional, local, national, global debates, discussions and meetings.
27	UGCHEMAECC02	Environmental Sciences	✓	✓	✓	✓	The knowledge on environmental sciences will aware the students for sustainable development of environment in the regional, local, national, global issues.

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