Teaching and Evaluation Scheme

B.Sc. Biomedical Sciences

Duration: 3 Years

(Multiple Exit and Entry Options)

SYLLABUS

(2024-2025)

SHOBHIT INSTITUTE OF ENGINEERINGAND TECHNOLOGY,
MEERUT (A NAAC Accredited Deemed to be University)

School of Biomedical Engineering and Health Sciences

Faculty of Engineering, Applied Sciences and Technology (FEAST)

B.Sc. Biomedical Sciences

Overview: B.Sc. Biomedical Sciences concerns with the topics to understand the biological principles that govern the functioning of the human body, to discover the mechanisms of any disease and to find new and distinct ways to cure a disease by developing advanced diagnostic tools or new therapeutic strategies. The B.Sc. Biomedical Sciences started as an interdisciplinary course at Shobhit University, Meerut. It is the applied domain of life and natural sciences, used for diagnosis, prevention and treatment of human diseases. Students should have prior knowledge of biological sciences to seek admission to B.Sc. Hons. (Biomedical Sciences).

B.Sc. Biomedical Sciences Program with Multiple exit and re-entry options

1. Duration: 3 Years
2. UG Certificate : 1 year (2 Semester): 40 Credits + 2 credits during Summer Vacation vocational course
3. UG Diploma : 2 years (4 Semester): 80 Credits + 2 credits during Summer Vacation vocational course
4. Degree: 3 Years (6 Semesters): 120 Credits + 4 credits during Summer Vacation vocational course

1. A semester comprises 90 working days and an academic year is divided into two semesters.
2. A summer term is for eight weeks during summer vacation. Internship/apprenticeship/work-based vocational education and training can be carried out during the summer term, especially by students who wish to exit after two semesters or four semesters of study. Regular courses may also be offered during the summer on a fast-track mode to enable students to do additional courses or complete backlogs in coursework. The HEIs can decide on the courses to be offered in the summer term depending on the availability of faculty and the number of students.
3. 1 credit lecture required minimum 15hrs lecture
4. 1 credit tutorial means 15 hours
5. 1 credit lab means 30 hours
6. 1 credit summer internship 30 hours
7. **Note:*** Honours students not undertaking research will do 3 courses for 12 credits in lieu of a research project / Dissertation.

Program Outcome: Bachelor of Science (B.Sc.) in Biomedical Sciences offers theoretical as well as practical knowledge about different subject areas. These subject areas include physics, chemistry, biology and other fields depending on the specialization a student opts. This programme is beneficial for students who have a strong interest and background in science and biology in specific. The course is also beneficial

for students who wish to pursue multi and inter-disciplinary science careers in future. Following are the various programme outcomes:

PO1. This course forms the basis of science and comprises of the subjects like physics, chemistry, biology, zoology and mathematics.

PO2. It helps to develop scientific temper and thus can prove to be more beneficial for the society as the scientific developments can make a nation or society to grow at a rapid pace.

PO3. After the completion of this course students have the option to go for higher studies i.e. M. Sc. and further to research for the welfare of mankind.

PO4. After higher studies students can join as scientist and can even look for professional job oriented courses.

PO5. This course also offers opportunities for serving in Indian Army, Indian Navy, Indian Air Force as officers.

PO6. Students after this course have the option to join Indian Civil Services as IAS, IFS etc.

PO7. Science graduates can go to serve in industries or may opt for establishing their own industrial unit.

PO8. After the completion of the B.Sc. degree there are various other options available for the science students. Often, in India and abroad the students are recruited directly by big MNC's after their completion of the course.

PO9. Apart from the research jobs, students can also work or get jobs in Marketing, Business & Other technical fields. Science graduates also recruited in the bank sector to work as customer service executives. Students can also find employment in government sectors.

Program Specific Outcome:

Objective of this program is to offer exciting career opportunities in specialist laboratory work, consultant work, research, education and management while serving the human society. The findings of the biomedical scientists are instrumental in making the advancements of modern medicine. However, the subject should not be considered as a substitute for medicine. Biomedical scientists usually work in the laboratory. They handle biological samples (blood, urine, cells and tissues) and use a wide range of laboratory equipments ranging from basic to hi-tech equipments.

Some of the common job roles and responsibilities of a biomedical scientist are:

PSO1. testing and screening for lifestyle diseases like diabetes, cancer or cardiovascular disease; and screening for infectious ones such as rubella, hepatitis or Ebola

PSO2. investigating and understanding the disease mechanisms, profile and progression

PSO3. finding new, effective and innovative ways to detect diseases as early as possible (e.g. discovery of new biomarkers or a new method of detecting a biomarker)

PSO4. working towards discovery and development of treatments, which could be preventive (vaccines) and/or therapeutic (drugs and medicines)

PSO5. In order to become a biomedical scientist a Bachelor's degree is a must.

Criteria	I	II	III	IV	V	VI	Total
Core Major	8	12	12	8	8	12	60
Discipline Specific Elective (DSE) Minor	3	3	3	6	6	3	24
Multidisciplinary Course (MDC)	3	-	-	3	-	3	9
Skill Enhancement Course (SEC)	3	3	6	3	6	1	22
Value added Course (VAC)	-	2		3		3	8
Ability Enhancement Course (AEC)	3	3			2		8
Research					2		2
Total	20	23	21	23	24	22	133
Additional Summer Internship		2		2			4
Exit Option		25		25		22	137
Grand Total	137						

	Level 5 Undergraduate Certificate (in the field of learning/discipline) for those who exit after the first year (two semesters) of the undergraduate programme. (Programme duration: first year or two semesters of the undergraduate programme)	**Level 6** Undergraduate Diploma (in the field of learning/discipline) for those who exit after two years (four semesters) of the undergraduate programme (Programme duration: First two years or four semesters of the undergraduate programme)	**Level 7** Bachelor' Degree (Programme duration: Three years or six semesters).
Entry Option	A candidate completing 10+2 years	**A candidate with 10+3+1/12+2/**	The entry requirement for Level 7 is a diploma obtained after completing two years (four semesters) of the undergraduate programme. A programme of study leading to the Bachelor's degree is open to those who have met the entrance requirements, including specified levels of attainment, in the programme admission regulations. Admission to a programme of study is based on the evaluation of documentary evidence (including the academic record) of the applicant's ability to undertake and complete a Bachelor's degree programme.
	With Diploma of Vocation or passed	**UG Certificate (Engg.) in appropriate**	
	10+2 or equivalent vocational	**Domain with level 5**	
	Training with level 4/ A candidate with Diploma in appropriate branch of Engineering/ UG Certificate/ Equivalent Vocational or Technical Program level 4.5	The entry requirement for Level 6 is a certificate obtained after completing the first year (two semesters) of the undergraduate programme. A programme of study leading to the second year of the Bachelor's degree is open to those who have met the entrance requirements, including specified levels of attainment, in the programme admission regulations. Admission to a programme of study is based on the evaluation of documentary evidence (including the academic record) of the applicant's ability to undertake and complete a Bachelor's degree programme	

Teaching Scheme
B.Sc. Biomedical Sciences (Semester – I)

Type of Subject	Subject Code	Subject Name	L	T	P	Credit
Core	T03BSBM0101	Human Anatomy and Physiology -I	3	1		4
Core	T03BSBM0102	Cell and Radiation Biology	3	1		4
DSE	T03BSBM0130	Bioorganic Chemistry	2	1		3
MDC	T02BSBT0145	Regenerative Biology	2	1		3
AEC	T05ASEN0151	Professional Communication	2	1		3
SEC	T03BSBM0160	Human Anatomy and Physiology Lab. -I			2	1
SEC	T03BSBM0161	Cell and Radiation Biology Lab.			2	1
SEC	T03BSBM0162	Bioorganic Chemistry Lab.			2	1
Total			12	5	6	20

B.Sc. Biomedical Sciences (Semester II)

Type of Subject	Subject Code	Subject Name	L	T	P	Credit
Core	T03BSBM0201	Diagnostic and Therapeutic Instrumentation	3	1		4
Core	T03BSBM0202	Immunology	3	1		4
Core	T03BSBM0203	Human Anatomy and Physiology-II	3	1		4
DSE	T03BSBM0230	Principles of Genetics	2	1		3
AEC	T04BTAT0280	Environmental Science	2	1		3
VAC	T03BSBM0280	Workshop/ Seminar / Training/ Conference/ Field Activity			4	2
SEC	T03BSBM0260	Diagnostic and Therapeutic Instrumentation Lab.			2	1
SEC	T03BSBM0261	Immunology Lab.			2	1
SEC	T03BSBM0262	Human Anatomy and Physiology-II Lab.			2	1
			13	5	5	23
Research	T03BSBM0290	Additional Summer Internship for Exit Option	-	-	4	2
TOTAL			13	5	19	25

B.Sc. Biomedical Sciences (Semester III)

Type of Subject	Subject Code	Subject Name	L	T	P	Credit
Core	T03BSBM0301	Molecular Biology	3	1		4
Core	T03BSBM0302	Microbiology	3	1		4
Core	T03BSBM0303	Biochemistry	3	1		4
DSE	T03BSBM0330	Medical Physics	2	1		3
SEC	T03BSBM0360	Bio-computation	2	1		3
SEC	T03BSBM0361	Molecular Biology Lab.			2	1
SEC	T03BSBM0362	Microbiology Lab.			2	1
SEC	T03BSBM0363	Biochemistry Lab.			2	1
Total			13	5	6	21

B.Sc. Biomedical Sciences (Semester IV)

Type of Subject	Subject Code	Subject Name	L	T	P	Credit
Core	T03BSBM0401	Pathology	3	1		4
Core	T03BSBM0402	Medical Biotechnology	3	1		4
DSE	T03BSBM0430	Toxicology	2	1		3
DSE	T03BSBM0431	Techniques for Forensic Science	2	1		3
MDC	T02BSBT0445	Statistical Methods in Biomedical Engineering	2	1		3
VAC	T03BSBM0480	Cell and Tissue Culture Technology	2		1	3
SEC	T03BSBM0460	Pathology Lab.			2	1
SEC	T03BSBM0461	Medical Biotechnology Lab.			2	1
SEC	T03BSBM0462	Toxicology Lab			2	1
	Total		14	5	7	23
Research	T03BSBM0490	Additional Summer Internship for Exit Option	-	-	4	2

B.Sc. Biomedical Sciences (Semester V)

Type of Subject	Subject Code	Subject Name	L	T	P	Credit
Core	T03BSBM0501	Medicinal Chemistry	3	1		4
Core	T03BSBM0502	Pharmacokinetics	3	1		4
DSE	T03BSBM0530	Genome Biology	2	1		3
DSE	T03BSBM0531	Pharmacology	2	1		3
SEC	T03BSBM0560	Medical Laboratory Diagnostics	2	1		3
SEC	T03BSBM0561	Medical Chemistry Lab.			2	1
SEC	T03BSBM0562	Pharmacokinetics Lab.			2	1
SEC	T03BSBM0563	Genome Biology Lab.			2	1
AEC	T03BSBM0550	Seminar	2			2
Research	T03BSBM0590	Internship	-	-	4	2
			14	5	10	24

B.Sc. Biomedical Sciences (Semester VI)

Type of Subject	Subject Code	Subject Name	L	T	P	Credit
Core	T03BSBM0601	Medical Microbiology	3	1		4
Core	T03BSBM0602	IPR	3	1		4
Core	T03BSBM0603	Medical Ethics	3	1		4
DSE	T03BSBM0630	Methods in Epidemiological Data Analysis	2	1		3
MDC	T02BSBT0645	Tools in Modern Biology	2	1		3
VAC	T03BSBM0680	Field Activity	2	1		3
SEC	T03BSBM0660	Medical Microbiology Lab.			2	1
Total			15	6	2	22