APPENDIX 5

Programme Type (UG/PG): UG/ B.Sc./B.Sc. Hons. /B.Sc. Hons with Research of Biotechnology

First Year - Semester I												
Course Category	**Course Code**	**Course Title**	**Nature of Course**	**No. of Credits**	**Teaching (Contact hrs / week)**		**Evaluation Scheme (Marks)**			**Minimum Passing (Marks)**		
					L	**P**	**Internal**	**External**	**Total**	**Internal**	**External**	**Total**
MM	SCB42MML101	Bacterial Biological Diversity	Lecture	3	3	-	60	40	100	-	16	40
MM	SCB42MML102	Bioinstrumentation	Lecture	2	2	-	30	20	50	-	8	20
IKS	SCB42IKL101	Zoology and Botany in India	Lecture	2	2	-	30	20	50	-	8	20
AEC	MGM54AEL104	Functional Marathi	Lecture	2	2	-	30	20	50	-	8	20
OE	OE-1	*OE-1 University Basket	Lecture	2	2	-	30	20	50	-	8	
OE	OE-2	*OE-2 University Basket	Lecture	2	2	-	30	20	50	-	8	20
VEC	MGM21VEL101	Environmental Studies	Lecture	2	2	4	30	20	50	-	8	20
VSC	SCB42VSP101	BT Lab I	Practical	2		4	30	20	50	-	8	20
SEC	SCB42SEP101	Explorations in Biotechnology –I	Practical	2		2	30	20	50	-	8	20
MM	SCB42MMP101	Bio-Skills Lab Factory-I	Practical	1	-	4	30	20	50	-	8	20
CC	MGM85CCP107	Cultural Activities	Practical	2		4	50	-	50	20	-	20
Total				**22**	**15**	**14**	**380**	**220**	**600**	**20**	**88**	**240**

Nature of Course: L- Lecture, P-Practical, S-Seminar, J-Project, I-Internship, D-Dissertation,

Course Category: MM-Major Mandatory, ME-Major Elective, MI-Minor, OE-Generic / Open electives, VSC-Vocational skill course, SEC-Skill Enhancement course, AEC-Ability Enhancement course, IKS-Indian Knowledge system, VEC-Value Education course, OJT-On Job Training / Internship / Apprenticeship, FP-Field project, CEP-Community engagement and service, CC-Co – curricular course, RM-Research methodology, RP-Research project

First Year- Semester II												
Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching (Contact hrs/ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
MM	SCB42MML103	Biomolecules and Bioenergetics	Lecture	2	2		30	20	50	-	8	20
MM	SCB42MML104	Biology: Concept, Connections, Investigation and applications	Lecture	3	3	-	60	40	100	-	16	40
MI	Minor	*Minor University Basket	Lecture	2	2	-	30	20	50	-	8	20
AEC	MGM54AEL102	Functional English	Lecture	2	2	-	30	20	50	-	8	20
OE	OE-3	*OE-3 University Basket	Lecture	2	2	-	30	20	50	-	8	20
OE	OE-4	*OE-4 University Basket	Lecture	2	2	-	30	20	50	-	8	20
VEC	MGM56VEL102	Constitution of India	Lecture	2	2	-	30	20	50	-	8	20
VSC	SCB42VSP102	BT Lab II	Practical	2		4	30	20	50	-	8	
SEC	SCB42SEP102	Explorations in Biotechnology – II	Practical	2		4	30	20	50	-	8	20
MM	SCB42MMP102	Bio-Skills Lab Factory-II	Practical	1	-	2	30	20	50	-	8	20
CC	MGM82CCP103	Sports	Practical	2	-	4	50	-	50	20	-	20
Total				**22**	**15**	**14**	**380**	**220**	**600**	**20**	**88**	**240**

Level 4.5 Award of UG certificate with 40 credits and an additional 4-credits core NSQF course / internship OR continue with major and minor

Second Year- Semester III												
Course Category	**Course Code**	**Course Title**	**Nature of Course**	**No. of Credits**	**Teaching (Contact hrs/ week)**		**Evaluation Scheme (Marks)**			**Minimum Passing (Marks)**		
					L	**P**	**Internal**	**External**	**Total**	**Internal**	**External**	**Total**
MM	SCB42MML201	Genome maintenance and regulation	Lecture	2	2	-	30	20	50	-	08	20
MM	SCB42MML202	Fermentation Technology	Lecture	3	3	-	60	40	100	-	16	40
MM	SCB42MML203	Principles of Developmental Biology	Lecture	2	2	-	30	20	50	-	08	20
OE	OE-5	*OE-5 University Basket	Lecture	2	2	-	30	20	50	-	08	20
MI	Minor	*Minor University Basket	Lecture	3	3	-	60	40	100	-	16	40
MI	Minor	*Minor University Basket	Practical	1	-	2	30	20	50	-	08	20
AEC	MGM54AEL103	Functional Hindi	Lecture	2	2	-	30	20	50	-	08	20
VSC	SCB42VSP201	Applied BT Lab-I	Practical	2	-	4	30	20	50	-	08	20
MM	SCB42MMP201	Microbial Technology Lab.	Practical	1	-	2	30	20	50	-	08	20
FP	SCB42FPJ201	Field Project	Project	2	-	4	50	-	50	20	-	20
CC	MGM82CCP201 / 101 / 102	Health and Wellness / National Cadet Crops / Yoga	Practical	2	-	4	50	-	50	20	-	20
Total				22	14	16	430	220	650	40	88	260

Second Year- Semester IV												
Course Category	**Course Code**	**Course Title**	**Nature of Course**	**No. of Credits**	**Teaching (Contact hrs/ week)**		**Evaluation Scheme (Marks)**			**Minimum Passing (Marks)**		
					L	**P**	Internal	External	Total	Internal	External	Total
MM	SCB42MML204	Molecular Immunology	Lecture	2	2	-	30	20	50	-	08	20
MM	SCB42MML205	Gene Technologies	Lecture	3	3	-	60	40	100	-	16	40
MM	SCB42MML206	Enzyme Engineering	Lecture	2	2	-	30	20	50	-	08	20
OE	OE-6	*OE-6 University Basket	Lecture	2	2	-	30	20	50	-	08	20
MI	Minor	*Minor University Basket	Lecture	3	3	-	60	40	100	-	16	40
AEC	MGM54AEL203	Communication Skills	Lecture	2	2	-	30	20	50	-	08	20
SEC	SCB42SEP201	Applied BT Lab-II	Practical	2		4	30	20	50	-	08	20
MI	Minor	*Minor University Basket	Practical	1	-	2	30	20	50	-	08	20
MM	SCB42MMP202	Advances in Microbial Technology	Practical	1	-	2	30	20	50	-	08	20
CEP	SCB42CEP201	Community Engagement Programme	Practical	2	-	4	50	-	50	20	-	20
CC	MGM82CCP104/ MGM73CCP105 / 106	NSS / Fine Arts / Visual Arts	Practical	2	-	4	50	-	50	20	-	20
Total				**22**	**14**	**16**	**430**	**220**	**650**	**40**	**88**	**260**

Level 4.5 Award of UG certificate with 40 credits and an additional 4-credits core NSQF course / internship OR continue with major and minor

Third Year- Semester V													
Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching (Contact hrs/ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
MM	SCB42MML301	Bioprocessing: Cell Culture & Scale up	Lecture	2	2	-	30	20	50		8	20
MM	SCB42MML302	System Biology	Lecture	3	3	-	60	40	100		16	40
MM	SCB42MML303	Biomanufacturing process science & Experiment Designing	Lecture	2	2	-	30	20	50		8	20
ME	SCB42MEL201	Phyton	Lecture	3	3	-	60	40	100		16	40
	SCB42MEL202	Plant Tissue Engineering										
MI	Minor	*Minor University Basket	Lecture	3	3	-	60	40	100		16	40
VSC	SCB42VSP301	Environment Biotechnology	Practical	2		4	30	20	50		8	20
MI	Minor	*Minor University Basket	Practical	1	-	2	30	20	50		8	20
VSC	SCB42VSP302	System Biology Lab	Practical	2	-	4	30	20	50		8	20
MM	SCB42MMP301	Introduction to Bio manufacturing Lab	Practical	1	-	2	30	20	50		8	20
FP	SCB42FPJ301	Field project	Project	2		4	50	-	50	20	-	20
ME	SCB42MEP201	Phytonlab	Practical	1	-	2	30	20	50		8	20
	SCB42MEP202	Plant Lab										
Total				22	13	18	440	260	700	20	104	280

Level 5.5 Award of UG degree in major and minor (44+44+44) =132 credits OR continue with major and minor

Third Year- Semester VI												
Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching (Contact hrs/ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
MM	SCB42MML304	Synthetic Biology	Lecture	2	2	-	30	20	50	-	8	20
MM	SCB42MML305	RNA Technology	Lecture	3	3	-	60	40	100	-	16	40
MM	SCB42MML306	Design Bio manufacturing, facilities, critical utilities, process & equipment	Lecture	3	3	-	60	40	100	-	16	40
ME	SCB42MEL 203	Genome Editing	Lecture	3	3	-	60	40	100	-	16	40
	SCB42MEL204	Bioanalytical Tools										
MI	Minor	*Minor University Basket	Lecture	3	3	-	30	20	50	-	8	20
MI	Minor	*Minor University Basket	Practical	1		2	30	20	50	-	8	20
OJT	SCB42JTP301	On Job Training	Training	4		8	60	40	100	-	16	40
MM	SCB42MMP302	Biological Lab.	Practical	1	-	2	30	20	50	-	8	20
MM	SCB42MMP303	Mini Project	Practical	1	-	2	30	20	50	-	8	20
ME	SCB42MEP 203	Data analysis and statistics	Practical	1	-	2	30	20	50	-	8	20
	SCB42MEP204	Bioanalytical tools Lab										
Total				22	14	16	420	280	700		112	280

APPENDIX 5A

Fourth Year- Semester VII												
Course Category	**Course Code**	**Course Title**	**Nature of Course**	**No. of Credits**	**Teaching (Contact hrs/ week)**		**Evaluation Scheme (Marks)**			**Minimum Passing (Marks)**		
					L	**P**	**Internal**	**External**	**Total**	**Internal**	**External**	**Total**
MM	SCB42MML401	Biosensor and Digital anatomy printing	Lecture	3	3		60	40	100		16	40
MM	SCB42MML402	Genetic Engineering in E.coli I	Lecture	3	3		60	40	100		16	40
MM	SCB42MML403	Secondary metabolites production In Microbes	Lecture	3	3		60	40	100		16	40
MM	SCB42MML404	Genetic Engineering in E.coli II	Lecture	2	2		30	20	50		8	20
ME	SCB42M EL301	Biological Data analysis with AI	Lecture	3	3		60	40	100		16	40
	SCB42M EL302	Molecular Diagnostics & Forensic Science										
RM	SCB42RML401	Research methodology–I	Lecture	3	3		60	40	100		16	40
RM	SCB42RMP401	Research methodology–II	Practical	1	-	2	30	20	50		8	20
ME	SCB42M EP301	Biological Data analysis with AI Lab	Practical	1	-	2	30	20	50		8	20
	SCB42M EP302	Molecular Diagnostics & Forensic Science Lab										
MM	SCB42MMP401	Secondary metabolites Detection in Biosensors Lab	Practical	1	-	2	30	20	50		8	20
MM	SCB42MMP402	Genetic Engineering in E.coli Lab (I & II)	Practical	1	-	2	30	20	50		8	20
MM	SCB42MMP403	Major Project	Practical	1	-	2	30	20	50		8	20
Total				22	17	10	480	320	800		128	320

Fourth Year- Semester VIII

Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching (Contact hrs/ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
MM	SCB42MML405	Bioethics, Biosafety &IPR	Lecture	3	3	-	60	40	100		16	40
MM	SCB42MML406	Patents and copyrights	Lecture	3	3	-	60	40	100		16	40
MM	SCB42MML407	GLP & GMP in Biotechnology	Lecture	3	3	-	60	40	100		16	40
MM	SCB42MML408	Case Study in Biotechnology	Lecture	2	2	-	30	20	50		8	20
ME	SCB42ME L303	Agri Informatics with AI	Lecture	3	3	-	60	40	100		16	40
	SCB42ME L304	Medical informatics with AI										
OJT	SCB42JTP401	On Job Training	Training	4	-	8	60	40	100		16	40
ME	SCB42ME P303	Agri Informatics with AI Lab	Practical	1	-	2	30	20	50		8	20
	SCB42ME P304	Medical informatics with AI Lab										
MM	SCB42MMP404	IPR, Patent Protection In Biotechnology Lab	Practical	1	-	2	30	20	50		8	20
MM	SCB42MMP405	GLP & GMP in Biotechnology Lab	Practical	1	-	2	30	20	50		8	20
MM	SCB42MMP406	Seminar(research paper based)	Practical	1	-	2	30	20	50		8	20
Total				22	14	16	450	300	750		120	300

Fourth Year- Semester VII Honours with Research												
Course Category	**Course Code**	**Course Title**	**Nature of Course**	**No. of Credits**	**Teaching (Contact hrs/ week)**		**Evaluation Scheme (Marks)**			**Minimum Passing (Marks)**		
					L	P	Internal	External	Total	Internal	External	Total
MM	SCB42MML401	Bioethics regulatory & quality control I	Lecture	3	3		60	40	100		16	40
MM	SCB42MML402	Biostatistics I	Lecture	2	2		30	20	50		8	20
MM	SCB42MML403	Subject based case studies I	Lecture	2	2		30	20	50		8	20
MM	SCB42MML404	Bioinformatics I	Lecture	2	2		30	20	50		8	20
ME	SCB42MEL301	Evolutionary application I	Lecture	3	3		60	40	100		16	40
	SCB42MEL302	Science Communication I										
RM	SCB42RML401	Research Methodology	Lecture	3	3		60	40	100		16	40
RM	SCB42RMP402	Research Methodology	Practical	1		2	30	20	50		8	20
ME	SCB42MEP301	Evolutionary application Lab I	Practical	1		2	30	20	50		8	20
	SCB42MEP302	Science Communication Lab I										
MM	SCB42MM401	Subject based case studies seminar I	Practical	1		2	30	20	50		8	20
RP	SCB42RPJ401	Research Project I	Practical	4		8	60	40	100		16	40
Total				**22**	**15**	**14**	**420**	**280**	**700**		**112**	**280**

Fourth Year- Semester VIII Honours with Research												
Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching (Contact hrs/ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
MM	SCB42MML405	Bioethics regulatory & quality control II	Lecture	3	3	-	60	40	100		16	40
MM	SCB42MML406	Biostatistics II	Lecture	2	2	-	30	20	50		8	20
MM	SCB42MML407	Subject based case studies II	Lecture	2	2	-	30	20	50		8	20
MM	SCB42MML408	Bioinformatics II	Lecture	2	2	-	30	20	50		8	20
ME	SCB42MEL303	Evolutionary application II	Lecture	3	3	-	60	40	100		16	40
	SCB42MEL304	Science Communication II										
ME	SCB42MEP303	Evolutionary application Lab II	Practical	1	-	2	30	20	50		8	20
	SCB42MEP304	Science Communication Lab II										
MM	SCB42MMP 402	Subject based case studies seminar II	Practical	1	-	2	30	20	50		8	20
RP	SCB42RPJ402	Research Project II	Practical	8	-	16	120	80	200		32	80
Total				**22**	**12**	**20**	**390**	**260**	**650**		**104**	**260**

Nature of Course: L- Lecture, P-Practical, S-Seminar, J-Project, I-Internship, D-Dissertation,
Course Category: MM-Major Mandatory, ME-Major Elective, MI-Minor, OE-Generic / Open electives, VSC-Vocational skill course, SEC-Skill Enhancement course, AEC-Ability Enhancement course, IKS-Indian Knowledge system, VEC-Value Education course, OJT-On Job Training / Internship / Apprenticeship, FP-Field project, CEP-Community engagement and service, CC-Co – curricular course, RM-Research methodology, RP-Research project

Lecture 1 credit = 15 hours, tutorial 1 credit = 15 hours, Practical 1 credit = 30hours,
Level 6.0 Four year UG Honours with research Degree in major and minor (44+44+44+44) = 176 credits
***[Students who secure 75% marks and above in the first six semesters and wish to undertake research at the undergraduate level can choose a research stream in the fourth year.]**