

NORTH MAHARASHTRA UNIVERSITY,

JALGAON (M.S.)

Bachelor of Engineering
(Biotechnology Engineering)

Faculty of Science and Technology



'A' Grade
NAAC Re-Accredited
(3rd Cycle)

SYLLABUS STRUCTURE

(As per AICTE Guidelines)

W.E.F. 2018 – 19

Subject Group Code and Subject Groups

Sr. No.	GROUP	Category	Breakup of Credits (Total 160)
1	A	Humanities and Social Sciences including Management Courses (HSMC)	12
2	B	Basic Science Courses (BSC)	25
3	C	Engineering Science Courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	24
4	D	Professional Core Courses (PCC)	48
5	E	Professional Elective Courses relevant to chosen specialization/branch (PEC)	18
6	F	Open subjects – Electives from other technical and /or emerging subjects (OEC)	18
7	G	Project work, seminar and internship in industry or appropriate work place/ academic and research institutions in India/abroad (PROJ)	15
8	H	Mandatory Courses (MC) [Environmental Sciences, Induction program, Indian Constitution, Essence of Indian Traditional Knowledge]	
Total			160

Syllabus Structure for First Year Engineering (Semester – I) (Mechanical, Auto, Civil, Chemical, Biotech.) (w.e.f. 2018 – 19)

(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Chemistry	B	3	1	-	4	40	60	-	-	100	4
Mathematics - I	B	3	1	-	4	40	60	-	-	100	4
Engineering Graphics	C	3	-	-	3	40	60	-	-	100	3
English	A	3	-	-	3	40	60	-	-	100	3
Chemistry Lab	B	-	-	2	2	-	-	25	-	25	1
Engineering Graphics Lab	C	-	-	2	2	-	-	25	25(OR)	50	1
English Lab	A	-	-	2	2	-	-	25	25(OR)	50	1
Workshop Practices	C	1	-	2	3	-	-	25	25(OR)	50	2
Induction Program*	H	-	-	-	-	-	-	-	-	-	0
		13	2	8	23	160	240	100	75	575	19

* 3-week long Induction Program for students entering the institution, right at the start.

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for First Year Engineering (Semester – II) (Mechanical, Auto, Civil, Chemical, Biotech.) (w.e.f. 2018 – 19)

(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Physics	B	3	1	-	4	40	60	-	-	100	4
Mathematics - II	B	3	1	-	4	40	60	-	-	100	4
Basic Electrical & Electronics Engineering	C	3	1	-	4	40	60	-	-	100	4
Programming for Problem Solving	C	3	-	-	3	40	60	-	-	100	3
Physics Lab	B	-	-	2	-	-	-	25	-	25	1
Basic Electrical & Electronics Engineering Lab	C	-	-	2	-	-	-	25	25(OR)	50	1
Programming for Problem Solving Lab	C	-	-	2	-	-	-	25	25(OR)	50	1
		12	3	6	21	160	240	75	50	525	18

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for Second Year Engineering (Semester – III) (Biotechnology) (w.e.f. 2019 – 20)

(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Biology	B	3	1	-	4	40	60	-	-	100	4
Bioprocess Calculations	C	3	-	-	3	40	60	-	-	100	3
Unit Operations	C	3	-	-	3	40	60	-	-	100	3
Microbiology	D	3	-	-	3	40	60	-	-	100	3
Bioprocess Industrial Economics & Management	A	3	-	-	3	40	60	-	-	100	3
LAB Unit Operations	C	-	-	2	2	-	-	25	25(OR)	50	1
LAB Microbiology	D	-	-	2	2	-	-	25	25(PR)	50	1
LAB Good Manufacturing Practices	D	1	-	2	3	-	-	25	25(OR)	50	2
		16	1	6	23	200	300	75	75	650	20

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for Second Year Engineering (Semester – IV) (Biotechnology) (w.e.f. 2019 – 20)

(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Biostatistics	B	3	1	-	4	40	60	-	-	100	4
Process Heat Transfer	C	3	-	-	3	40	60	-	-	100	3
Immunology	D	3	-	-	3	40	60	-	-	100	3
Biochemistry	D	3	-	-	3	40	60	-	-	100	3
IPR& Entrepreneurship	A	3	-	-	3	40	60	-	-	100	3
Process Heat Transfer		-	-	2	2	-	-	25	-		1
LAB Immunology		-	-	2	2	-	-	25	25(PR)	50	1
LAB Biochemistry		-	-	2	2	-	-	25	25(PR)	50	1
LAB- Environmental Biotechnology	D	1	-	2	3	-	-	-	25(OR)	50	2
Environmental Science	H	-	-	-	-	-	-	-	-	-	
		16	1	8	25	200	300	75	75	650	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for Third Year Engineering (Semester – V) (Biotechnology) (w.e.f. 2020 – 21)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Molecular Biology	D	3	-	-	3	40	60	-	-	100	3
Reaction Engineering	D	3	-	-	3	40	60	-	-	100	3
Enzyme Engineering	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course –I	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – I	F	3	-	-	3	40	60	-	-	100	3
LAB Molecular Biology		-	-	2	2	-	-	25	25(OR)	50	1
LAB Reaction Engineering		-	-	2	2	-	-	25	25(OR)	50	1
LAB- Pharmaceutical Biotechnology	D	-	-	2	2	-	-	25	25(OR)	50	1
Minor Project (Stage-I)	G	-	-	6	6	-	-	50	-	50	3
Constitution of India		-	-	-	-	-	-	-	-	-	0
		15	0	12	27	200	300	125	75	700	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – I		Open Elective Course – I	
1		1	
2		2	
3		3	
4		4	

Syllabus Structure for Third Year Engineering (Semester – VI) (Biotechnology) (w.e.f. 2020 – 21)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Genetic Engineering	D	3	-	-	3	40	60	-	-	100	3
Mass Transfer	D	3	-	-	3	40	60	-	-	100	3
Bioprocess Engineering	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – II	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – II	F	3	-	-	3	40	60	-	-	100	3
LAB Genetic Engineering		-	-	2	2	-	-	25	25(OR)	50	1
LAB Mass Transfer		-	-	2	2	-	-	25	25(OR)	50	1
LAB Bioprocess Engineering		-	-	2	2	-	-	25	-	25	1
Minor Project	G	-	-	6	6	-	-	50	25(OR)	75	3
		15	-	12	27	200	300	125	75	700	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – II		Open Elective Course – II	
1		1	
2		2	
3		3	
4		4	

Note: Every student should undergo Summer Internship during Summer Vacation of at least THREE weeks duration. Credits for Summer Internship shall be included in Project (Stage – I) of Semester – VII.

Syllabus Structure for Fourth Year Engineering (Semester – VII) (Biotechnology) (w.e.f. 2021 – 22)

(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Bioinformatics	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – III	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – IV	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – III	F	3	-	-	3	40	60	-	-	100	3
LAB Bioinformatics	D	-	-	2	2			25	25(PR)	50	1
LAB Plant Tissue Culture	D	1	-	2	3	-	-	25	25(OR)	50	2
Project (Stage – I)	G		-	12	12	-	-	50	50(OR)	100	6
Essence of Indian Traditional Knowledge		-	-	-	-	-	-	-	-	-	0
		13	-	16	29	160	240	100	100	600	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – III		Professional Elective Course – IV		Open Elective Course – III	
1		1		1	
2		2		2	
3		3		3	
4		4		4	

Syllabus Structure for Fourth Year Engineering (Semester – VIII) (Biotechnology) (w.e.f. 2021 – 22)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Bioprocess Industries	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – V	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – VI	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – IV	F	3	-	-	3	40	60	-	-	100	3
LAB Downstream Processing	D	2	-	2	4	-	-	25	25(OR)	50	3
LAB Bioprocess Industries	D	-	-	2	2	-	-	25	25(OR)	50	1
Project	G	-	-	6	6	-	-	50	50(OR)	100	3
		14	-	12	24	160	240	100	100	600	19

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – V		Professional Elective Course – VI		Open Elective Course – IV	
1		1		1	
2		2		2	
3		3		3	
4		4		4	

