

2.5.1 Mechanism of internal assessment is transparent and robust in terms of frequency and mode

Sr. No	Details
1	Mumbai University Syllabus Scheme (Rev-2016)
2	Mumbai University Syllabus Scheme (Rev-2019)



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Mumbai University Syllabus Scheme

(Rev-2016)



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Bandra (W), Mumbai - 400 050.



AC 05/05/2018

Item No. 4.57

UNIVERSITY OF MUMBAI



**Revised Syllabus for the
TE Biomedical Engineering
(Third Year - Semester V and VI)**

(As per Choice Based Credit and Grading System
with effect from the academic year 2018–2019)



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Examination Scheme for Semester VI

Course Code	Course Name	Examination Scheme												Total Marks
		Theory				Term work		Practical		Oral		Pract./Oral		
		External (UA)		Internal (CA)										
		Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks	
BMC601	Biomedical Monitoring Equipment	80	32	20	8	---	---	---	---	---	---	---	---	100
BMC602	Microprocessors and Microcontrollers	80	32	20	8	---	---	---	---	---	---	---	---	100
BMC603	Digital Image Processing	80	32	20	8	---	---	---	---	---	---	---	---	100
BMC604	Medical Imaging-I	80	32	20	8	---	---	---	---	---	---	---	---	100
BMDLO 602X	Department Level Optional Course – II	80	32	20	8	---	---	---	---	---	---	---	---	100
BML601	Biomedical Monitoring Equipment	---	---	---	---	25	10	---	---	---	---	25	10	50
BML602	Microprocessors and Microcontrollers	---	---	---	---	25	10	---	---	---	---	25	10	50
BML603	Digital Image Processing	---	---	---	---	25	10	---	---	---	---	25	10	50
BML604	Medical Imaging-I	---	---	---	---	25	10	---	---	25	10	---	---	50
BMDLL 602X	Department Level Optional Course Laboratory – II	---	---	---	---	25	10	---	---	25	10	---	---	50
Total		400	160	100	40	125	50	---	---	50	20	75	30	750



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AC
Item No.

UNIVERSITY OF MUMBAI



Revised Syllabus for the
Biomedical Engineering
(Final Year – Semester VII and VIII)

(As per Choice Based Credit and Grading System
with effect from the academic year 2019–2020)



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Examination Scheme for Semester VII

Course Code	Course Name	Examination Scheme												Total Marks
		Theory				Term work		Practical		Oral		Pract./Oral		
		External		Internal										
		(UA)		(CA)		Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks	
BMC701	Life Saving and Surgical Equipment	80	32	20	8	---	---	---	---	---	---	---	---	100
BMC702	Basics of VLSI	80	32	20	8	---	---	---	---	---	---	---	---	100
BMC703	Medical Imaging-II	80	32	20	8	---	---	---	---	---	---	---	---	100
BMDLO 703X	Department Level Optional Course - III	80	32	20	8	---	---	---	---	---	---	---	---	100
ILE101X	Institute Level Optional Course – I	80	32	20	8	---	---	---	---	---	---	---	---	100
BML701	Life Saving and Surgical Equipment	---	---	---	---	25	10	---	---	25	10	---	---	50
BML702	Basics of VLSI	---	---	---	---	25	10	---	---	25	10	---	---	25
BML703	Medical Imaging-II	---	---	---	---	25	10	---	---	25	10	---	---	50
BMDLL 703X	Department Level Optional Course Laboratory – III	---	---	---	---	25	10	---	---	25	10	---	---	25
BML704	Project Stage I	---	---	---	---	25	10	---	---	25	10	---	---	50
Total		400	160	100	40	125	50	---	---	125	50			700



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Examination Scheme for Semester VIII

Course Code	Course Name	Examination Scheme												Total Marks
		Theory				Term work		Practical		Oral		Pract./Oral		
		External		Internal										
		(UA)		(CA)		Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks	
BMC801	Biomedical Microsystems	80	32	20	8	---	---	---	---	---	---	---	---	100
BMC802	Hospital Management	80	32	20	8	---	---	---	---	---	---	---	---	100
BMDLO 801X	Department Level Optional Course - IV	80	32	20	8	---	---	---	---	---	---	---	---	100
ILO202X	Institute Level Optional Course –II	80	32	20	8	---	---	---	---	---	---	---	---	100
BML801	Biomedical Microsystems	---	---	---	---	25	10	---	---	25	10	---	---	50
BML802	Hospital Management	---	---	---	---	25	10	---	---	25	10	---	---	50
BMDLL 801X	Department Level Optional Course Laboratory – IV	---	---	---	---	25	10	---	---	25	10	---	---	25
BML803	Project Stage II	---	---	---	---	50	20	---	---	---	---	50	20	100
Total		320	128	80	32	125	50	---	---	75	30	50	20	625



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UNIVERSITY OF MUMBAI



Revised syllabus (Rev- 2016) from Academic Year 2016 -17

Biotechnology

Second Year with Effect from AY 2017-18

Third Year with Effect from AY 2018-19

Final Year with Effect from AY 2019-20

Under

FACULTY OF TECHNOLOGY

As per **Choice Based Credit and Grading System**

With effect from the AY 2016-17

University of Mumbai
Program Structure for B.E. Biotechnology (Revised 2016)
S.E. Semester III (w.e.f 2017-2018)

Course code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
BTC301	Applied Mathematics-III	3	-	1	3	-	1	4
BTC302	Microbiology	4	-	-	4	-	-	4
BTC303	Cell Biology	3	-	1	3	-	1	4
BTC304	Biochemistry	4	-	-	4	-	-	4
BTC305	Unit Operations-I	3	-	-	3	-	-	3
BTC306	Process Calculations	3	-	1	3	-	1	4
BTL301	Microbiology Lab	-	3	-	-	1.5	-	1.5
BTL302	Biochemistry Lab	-	3	-	-	1.5	-	1.5
BTL303	Unit Operations-I Lab	-	2	-	-	1	-	1
Total		20	8	3	20	4	3	27

Course code	Course Name	Examination Scheme								
		Theory					Term Work	Pract/ Oral	Oral	Total
		Internal Assessment			End Sem Exam	Exam Duration (in hrs)				
		Test 1	Test 2	Avg						
BTC301	Applied Mathematics-III	20	20	20	80	3	25	-	-	125
BTC302	Microbiology	20	20	20	80	3	-	-	-	100
BTC303	Cell Biology	20	20	20	80	3	25	-	-	125
BTC304	Biochemistry	20	20	20	80	3	-	-	-	100
BTC305	Unit Operations-I	20	20	20	80	3	-	-	-	100
BTC306	Process Calculations	20	20	20	80	3	25	-	-	125
BTL301	Microbiology Lab							25		25
BTL302	Biochemistry Lab							25		25
BTL303	Unit Operations-I Lab								25	25
Total				120	480	-	75	50	25	750



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University of Mumbai
Program Structure for B.E. Biotechnology (Revised 2016)
S.E. Semester IV (w.e.f 2017-2018)

Course code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
BTC401	Applied Mathematics-IV	3	-	1	3	-	1	4
BTC402	Molecular Genetics	3	-	1	3	-	1	4
BTC403	Fermentation Technology	4			4			4
BTC404	Analytical Methods in Biotechnology	4	-	-	4	-	-	4
BTC405	Immunology and Immunotechnology	3	-	1	3	-	1	4
BTC406	Unit Operations -II	3			3			3
BTL401	Fermentation Technology Lab	-	3	-		1.5	-	1.5
BTL402	Analytical Methods in Biotechnology Lab	-	3	-		1.5	-	1.5
BTL403	Unit Operations –II Lab	-	2	-		1	-	1
	Total	20	8	3	20	4	3	27

Course code	Course Name	Examination Scheme								
		Theory					Term Work	Pract/ Oral	Oral	Total
		Internal Assessment			End Sem Exam	Exam Duration (in hrs)				
		Test 1	Test 2	Avg						
BTC401	Applied Mathematics-IV	20	20	20	80	3	25	-	-	125
BTC402	Molecular Genetics	20	20	20	80	3	25	-	-	125
BTC403	Fermentation Technology	20	20	20	80	3	-	-	-	100
BTC404	Analytical Methods in Biotechnology	20	20	20	80	3	-	-	-	100
BTC405	Immunology and Immunotechnology	20	20	20	80	3	25	-	-	125
BTC406	Unit Operations -II	20	20	20	80	3	-	-	-	100
BTL401	Fermentation Technology Lab		-	-	-	3	-	25		25
BTL402	Analytical Methods in Biotechnology Lab	-	-	-	-	3	-	25	-	25
BTL403	Unit Operations –II Lab	-	-	-	-	-	-	-	25	25
	Total			120	480	-	75	50	25	750


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UNIVERSITY OF MUMBAI



Revised syllabus (Rev- 2016) from Academic Year 2016 -17

Biotechnology

Second Year with Effect from AY 2017-18

Third Year with Effect from AY 2018-19

Final Year with Effect from AY 2019-20

Under

FACULTY OF TECHNOLOGY

As per **Choice Based Credit and Grading System**

With effect from the AY 2016-17

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Bandra (W), Mumbai - 400 050.



University of Mumbai
Program Structure for B.E. Biotechnology (Revised 2016)
T.E. Semester V (w.e.f 2018-2019)

Course code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			Total
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	
BTC501	Bioinformatics	4	-	-	4	-	-	4
BTC502	Genetic Engineering	4	-	-	4	-	-	4
BTC503	Thermodynamics and Biochemical Engineering	3	-	1	3	-	1	4
BTC504	Bioreactor Analysis and Technology	3	-	1	3	-	1	4
BTC505	Business Communication and Ethics	2	-	2	-	-	2	2
BTE501X	Elective I	3	-	1	3	-	1	4
BTL501	Bioinformatics Lab	-	2	-	-	1	-	1
BTL502	Genetic Engineering Lab		3			1.5		1.5
BTL503	Lab I		3			1.5		1.5
Total		17	12	3	17	6	3	26

Course code	Course Name	Examination Scheme								
		Theory					Term Work	Pract/Oral	Oral	Total
		Internal Assessment			End Sem Exam	Exam Duration (in hrs)				
		Test 1	Test 2	Avg						
BTC501	Bioinformatics	20	20	20	80	3	-	-	100	
BTC502	Genetic Engineering	20	20	20	80	3		-	100	
BTC503	Thermodynamics and Biochemical Engineering	20	20	20	80	3	25	-	125	
BTC504	Bioreactor Analysis and Technology	20	20	20	80	3	25	-	125	
BTC505	Business Communication and Ethics	-	-	-	-	-	50	-	50	
BTE501X	Department Elective I	20	20	20	80	3	25	-	125	
BTL501	Bioinformatics Lab					2		25	25	
BTL502	Genetic Engineering Lab					3		25	25	
BTL503	Lab I	-	-	-	-	3		25	25	
Total				100	400	-	125	75	700	

Department Elective I (Sem V)		
Engineering Stream	Advanced Science Stream	Technology Stream
1. Biosensors and Diagnosis (BTE5011)	1. Biophysics (BTE5012) 2. Biostatistics (BTE5013)	1. Pharmaceutical Technology (BTE5014)

University of Mumbai
Program Structure for B.E. Biotechnology (Revised 2016)
T.E. Semester VI (w.e.f 2018-2019)

Course code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
BTC601	Food Technology	3	-	1	3	-	1	4
BTC602	Cell & Tissue Culture	4	-	-	4	-	-	4
BTC603	Enzyme Engineering	4	-	-	4	-	-	4
BTC604	IPR, Bioethics and Bio safety	3	-	1	3	-	1	4
BTC605	Process Control & Instrumentation	3	-	1	3	-	1	4
BTE602X	Elective-II	3	-	1	3	-	1	4
BTL601	Lab-II	-	3	-	-	1.5	-	1.5
BTL602	Lab-III	-	3	-	-	1.5	-	1.5
	Total	20	6	4	20	3	4	27

Course code	Course Name	Examination Scheme								
		Theory					Term Work	Pract/ Oral	Oral	Total
		Internal Assessment			End Sem Exam	Exam Duration (in hrs)				
		Test 1	Test 2	Avg						
BTC601	Food Technology	20	20	20	80	3	25	-	-	125
BTC602	Cell & Tissue Culture	20	20	20	80	3	-	-	-	100
BTC603	Enzyme Engineering	20	20	20	80	3	-	-	-	100
BTC604	IPR, Bioethics and Bio safety	20	20	20	80	3	25	-	-	125
BTC605	Process Control & Instrumentation	20	20	20	80	3	25	-	-	125
BTE602X	Elective-II	20	20	20	80	3	25	-	-	125
BTL601	Lab-II	-	-	-	-	3	-	25	-	25
BTL602	Lab-III	-	-	-	-	3	-	25	-	25
	Total			120	480	-	100	50	--	750

Department Elective II (Sem VI)		
Engineering Stream	Advanced Science Stream	Technology Stream
1. Computational Fluid Dynamics (BTE6021)	1. Protein Engineering (BTE6022) 2. Cancer Biology(BTE6023)	1. Green technology (BTE6024)

UNIVERSITY OF MUMBAI



Revised syllabus (Rev- 2016) from Academic Year 2016 -17

Biotechnology

Second Year with Effect from AY 2017-18

Third Year with Effect from AY 2018-19

Final Year with Effect from AY 2019-20

Under

FACULTY OF TECHNOLOGY

As per **Choice Based Credit and Grading System**

With effect from the AY 2016-17



University of Mumbai
Program Structure for B.E. Biotechnology (Revised 2016)
B.E. Semester VII (w.e.f 2019-2020)

Course code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
BTC701	Bioseperation & Downstream Processing Technology-I	4	-	1	4	-	1	5
BTC702	Bioprocess Modelling and Simulation	4	-	1	4	-	1	5
BTC703	Agriculture Biotechnology	3	-	1	3	-	1	4
BTE703X	Department Elective III	3	-	1	3	-	1	4
ILO701X	Institute Level optional Subject I	3	-	-	3	-	-	3
BTP701	Project A	-	-	6	-	-	3	3
BTL701	Lab - IV	-	3	-	-	1.5	-	1.5
BTL702	Lab - V	-	3	-	-	1.5	-	1.5
Total		17	6	10	17	3	7	27

Course code	Course Name	Examination Scheme								
		Theory					Term Work	Pract/Oral	Oral	Total
		Internal Assessment			End Sem Exam	Exam Duration (in hrs)				
		Test 1	Test 2	Avg						
BTC701	Bioseperation & Downstream Processing Technology-I	20	20	20	80	3	25	-	-	125
BTC702	Bioprocess Modelling and Simulation	20	20	20	80	3	25	-	-	125
BTC703	Agriculture Biotechnology	20	20	20	80	3	25	-	-	125
BTE703X	Department Elective III	20	20	20	80	3	25	-	-	125
ILO701X	Institute Level optional Subject I	20	20	20	80	3	-	-	-	100
BTP701	Project A	-	-	-	-	-	100		50	150
BTL701	Lab - IV	-	-	-	-	-	-	25	-	25
BTL702	Lab - V	-	-	-	-	-	-	25	-	25
Total				100	400	-	200	50	50	800

Department Elective III (Sem VII)		
Engineering Stream	Advanced Science Stream	Technology Stream
1. Stem Cell & Tissue Engineering (BTE7031)	1. Operation research in Biotechnology (BTE7032) 2. Project Management (BTE7033)	1. Nanotechnology (BTE7034)

Institute Level Optional Subject I (Sem VII)		
1. Product Lifecycle Management (ILO7011)	4. Design of Experiments (ILO7014)	7. Disaster Management and Mitigation Measures (ILO7017)
2. Reliability Engineering (ILO7012)	5. Operation Research (ILO7015)	8. Energy Audit and Management (ILO7018)
3. Management Information System (ILO7013)	6. Cyber Security and Laws (ILO7016)	9. Development Engineering (ILO7019)



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University of Mumbai
Program Structure for B.E. Biotechnology (Revised 2016)
B.E. Semester VIII (w.e.f 2019-2020)

Course code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
BTC801	Environmental Biotechnology	4	-	-	4	-	-	4
BTC802	Bioseparation & Downstream Processing technology-II	4	-	-	4	-	-	4
BTC803	Bioprocess Plant & Equipment design	3	-	1	3	-	1	4
BTE804X	Department Elective IV	3	-	1	3	-	1	4
ILO802X	Institute Level optional Subject II	3	-	-	3	-	-	3
BTP801	Project B	-	-	8	-	-	6	6
BTL801	Lab - VI	-	3	-	-	1.5	-	1.5
BTL802	Lab - VII	-	3	-	-	1.5	-	1.5
	Total	17	6	10	17	3	8	28

Course code	Course Name	Examination Scheme								
		Theory				Term Work	Pract/Oral	Oral	Total	
		Internal Assessment			End Sem Exam	Exam Duration (in hrs)				
		Test 1	Test 2	Avg						
BTC801	Environmental Biotechnology	20	20	20	80	3	-	-	-	100
BTC802	Bioseparation & Downstream Processing technology-II	20	20	20	80	3	-	-	-	100
BTC803	Bioprocess Plant & Equipment design	20	20	20	80	3	25	-	-	125
BTE804X	Department Elective IV	20	20	20	80	3	25	-	-	125
ILO802X	Institute Level optional Subject II	20	20	20	80	3	-	-	-	100
BTP801	Project B	-	-	-	-	-	100	-	50	150
BTL801	Lab - VI	-	-	-	-	3	-	25	-	25
BTL802	Lab - VII	-	-	-	-	3	-	25	-	25
	Total			100	400	-	150	50	50	750

Department Elective IV (Sem VIII)		
Engineering Stream	Advanced Science Stream	Technology Stream
1. Non-conventional Sources of Energy (BTE8041)	1. Total Quality Management (BTE8042) 2. Entrepreneurship (BTE8043)	1. Advanced Bioinformatics (BTE8044)

Institute Level Optional Subject II (Sem VIII)		
1. Project Management (ILO8021)	4. Human Resource Management (ILO8024)	7. IPR and Patenting (ILO8027)
2. Finance Management (ILO8022)	5. Professional Ethics and CSR (ILO8025)	8. Digital Business Management (ILO8028)
3. Entrepreneurship Development and Management (ILO8023)	6. Research Methodology (ILO8026)	9. Environmental Management (ILO8029)

AC – 5th May, 2018

Item No. – 4.51

UNIVERSITY OF MUMBAI



Revised syllabus (Rev- 2016) from Academic Year 2016 -17

Under

FACULTY OF TECHNOLOGY

Computer Engineering

Second Year with Effect from **AY 2017-18**

Third Year with Effect from **AY 2018-19**

Final Year with Effect from **AY 2019-20**

As per **Choice Based Credit and Grading System**

with effect from the AY 2016–17

Program Structure B.E. Computer Engineering, (Rev. 2016) w.e.f. AY 2018-19

T. E. Computer Engineering (Semester-VI)

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract	Tut	Theory	TW/Pract	Tut	Total
CSC601	Software Engineering	4	-	-	4	-	-	4
CSC602	System Programming & Compiler Construction	4	-	-	4	-	-	4
CSC603	Data Warehousing & Mining	4	-	-	4	-	-	4
CSC604	Cryptography & System Security	4	-	-	4	-	-	4
CSDLO 601X	Department Level Optional Course -II	4	-	-	4	-	-	4
CSL601	Software Engineering Lab	-	2	-	-	1	-	1
CSL602	System software Lab	-	2	-	-	1	-	1
CSL603	Data Warehousing & Mining Lab	-	2	-	-	1	-	1
CSL604	System Security Lab	-	2	-	-	1	-	1
CSP605	Mini-Project	-	4	-	-	2	-	2
	Total	20	12	-	20	6	-	26

Course Code	Course Name	Examination Scheme								
		Theory					TW	Oral	Oral & Pract	Total
		Internal Assessment			End Sem. Exam	Exam Duration (in Hrs)				
		Test 1	Test 2	Avg.						
CSC601	Software Engineering	20	20	20	80	3	-	-	-	100
CSC602	System Programming & Compiler Construction	20	20	20	80	3	-	-	-	100
CSC603	Data Warehousing & Mining	20	20	20	80	3	-	-	-	100
CSC604	Cryptography & System Security	20	20	20	80	3	-	-	-	100
CSDLO 601X	Department Level Optional Course -II	20	20	20	80	3	-	-	-	100
CSL601	Software Engineering Lab	-	-	-	-	-	25	25	--	50
CSL602	System Software Lab	-	-	-	-	-	25	--	25	50
CSL603	Data Warehousing & Mining Lab	-	-	-	-	-	25	--	25	50
CSL604	System Security Lab	-	-	-	-	-	25	---	25	50
CSP605	Mini-Project	-	-	-	-	-	25	---	25	50
	Total	100	100	100	400	-	125	25	100	750

AC –
Item No.

UNIVERSITY OF MUMBAI



Revised syllabus (Rev- 2016) from Academic Year 2016 -17

Under

FACULTY OF TECHNOLOGY

Computer Engineering

Second Year with Effect from **AY 2017-18**

Third Year with Effect from **AY 2018-19**

Final Year with Effect from **AY 2019-20**

As per **Choice Based Credit and Grading System**
with effect from the AY 2016–17

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Bandra (W), Mumbai - 400 050.



Program Structure B.E. Computer Engineering, (Rev. 2016) w.e.f. AY 2019-20
B. E. Computer Engineering (Semester-VII)

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract	Tut	Theory	TW/Pract	Tut	Total
CSC701	Digital Signal & Image Processing	4	-	-	4	-	-	4
CSC702	Mobile Communication & Computing	4	-	-	4	-	-	4
CSC703	Artificial Intelligence & Soft Computing	4	-	-	4	-	-	4
CSDLO 701X	Department Level Optional Course -III	4	-	-	4	-	-	4
ILO701X	Institute Level Optional Course-I	3	-	-	3	-	-	3
CSL701	Digital Signal & Image Processing Lab	-	2	-	-	1	-	1
CSL702	Mobile App. Development. Tech. Lab	-	2	-	-	1	-	1
CSL703	Artificial Intelligence & Soft Computing Lab	-	2	-	-	1	-	1
CSL704	Computational Lab-I	-	2	-	-	1	-	1
CSP705	Major Project-I	-	6	-	-	3	-	3
	Total	19	14	-	19	7	-	26

Course Code	Course Name	Examination Scheme								
		Theory					TW	Oral	Oral & Pract	Total
		Internal Assessment			End Sem. Exam	Exam Duration (in Hrs)				
		Test 1	Test 2	Avg.						
CSC701	Digital Signal & Image Processing	20	20	20	80	3	-	--	-	100
CSC702	Mobile Communication & Computing	20	20	20	80	3	-	--	-	100
CSC703	Artificial Intelligence & Soft Computing	20	20	20	80	3	-	--	-	100
CSDLO 701X	Department Level Optional Course -III	20	20	20	80	3	-	--	-	100
ILO701X	Institute Level Optional Course-I	20	20	20	80	3	--	--	-	100
CSL701	Digital Signal & Image Processing Lab	-	-	-	-	-	25	--	--	25
CSL702	Mobile App. Development. Tech. Lab	-	-	-	-	-	25	--	25	50
CSL703	Artificial Intelligence & Soft Computing Lab	--	-	-	-	--	25	25	--	50
CSL704	Computational Lab-I						25	--	25	50
CSP705	Major Project-I	-	-	-	-	-	50	-	25	75
	Total	100	100	100	400		150	25	75	750

Sem.	Department Level Optional Course (DLOC)	Institute Level Optional Course (ILOC)
V	CSDLO5011: Multimedia System CSDLO5012: Advance Operating System CSDLO5013: Advance Algorithm	-----
VI	CSDLO6021: Machine Learning CSDLO6022: Advance Database System CSDLO6023: Enterprise Resource Planning CSDLO6024: Advance Computer Network	-----
VII	CSDLO7031: Advance System Security & Digital Forensics CSDLO7032: Big Data & Analytics CSDLO7033: Robotics	ILO7011. Product Lifecycle Management ILO7012. Reliability Engineering ILO7013. Management Information System ILO7014. Design of Experiments ILO7015. Operation Research ILO7016. Cyber Security and Laws ILO7017. Disaster Management & Mitigation Measures ILO7018. Energy Audit and Management ILO7019. Development Engineering
VIII	DLO8011: High Performance Computing DLO8012: Natural Language Processing DLO8013: Adhoc Wireless Network	ILO8021. Project Management ILO8022. Finance Management ILO8023. Entrepreneurship Development and Management ILO8024. Human Resource Management ILO8025. Professional Ethics and CSR ILO8026. Research Methodology ILO8027. IPR and Patenting ILO8028. Digital Business Management ILO8029. Environmental Management



AC –
Item No.

UNIVERSITY OF MUMBAI



Revised syllabus (Rev- 2016) from Academic Year 2016 -17

Under

FACULTY OF TECHNOLOGY

Computer Engineering

Second Year with Effect from **AY 2017-18**

Third Year with Effect from **AY 2018-19**

Final Year with Effect from **AY 2019-20**

As per **Choice Based Credit and Grading System**
with effect from the AY 2016–17



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Program Structure B.E. Computer Engineering, (Rev. 2016) w.e.f. AY 2019-20

B. E. Computer Engineering (Semester-VIII)

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract	Tut	Theory	TW/Pract	Tut	Total
CSC801	Human Machine Interaction	4	-	-	4	-	-	4
CSC802	Distributed Computing	4	-	-	4	-	-	4
CSDLO 801X	Department Level Optional Course -IV	4	-	-	4	-	-	4
ILO801X	Institute Level Optional Course-II	3	-	-	3	-	-	3
CSL801	Human Machine Interaction Lab	-	2	-	-	1	-	1
CSL802	Distributed Computing Lab	-	2	-	-	1	-	1
CSL803	Cloud Computing Lab	-	4	-	-	2	-	2
CSL804	Computational Lab-II	-	2	-	-	1	-	1
CSP805	Major Project-II	-	12	-	-	6	-	6
	Total	15	22	-	15	11	-	26

Course Code	Course Name	Examination Scheme								
		Theory					TW	Oral	Oral & Pract	Total
		Internal Assessment			End Sem. Exam	Exam Duration (in				
		Test 1	Test 2	Avg.						
CSC801	Human Machine Interaction	20	20	20	80	3	-	-	-	100
CSC802	Distributed Computing	20	20	20	80	3	-	-	-	100
CSDLO 801X	Department Level Optional Course -IV	20	20	20	80	3	-	-	-	100
ILO801X	Institute Level Optional Course-II	20	20	20	80	3	-	-	-	100
CSC801	Human Machine Interaction Lab						25	25	-	50
CSL802	Distributed Computing Lab	-	-	-	-	-	25	25	-	50
CSL803	Cloud Computing Lab	-	-	-	-	-	50	--	25	75
CSL804	Computational Lab-II	-	-	-	-	-	50	--	25	75
CSP805	Major Project-II						50	--	50	100
	Total	80	80	80	320	--	200	50	100	750



Sem.	Department Level Optional Course (DLOC)	Institute Level Optional Course (ILOC)
V	CSDLO5011: Multimedia System CSDLO5012: Advance Operating System CSDLO5013: Advance Algorithm	-----
VI	CSDLO6021: Machine Learning CSDLO6022: Advance Database System CSDLO6023: Enterprise Resource Planning CSDLO6024: Advance Computer Network	-----
VII	CSDLO7031: Advance System Security & Digital Forensics CSDLO7032: Big Data & Analytics CSDLO7033: Robotics	ILO7011. Product Lifecycle Management ILO7012. Reliability Engineering ILO7013. Management Information System ILO7014. Design of Experiments ILO7015. Operation Research ILO7016. Cyber Security and Laws ILO7017. Disaster Management & Mitigation Measures ILO7018. Energy Audit and Management ILO7019. Development Engineering
VIII	DLO8011: High Performance Computing DLO8012: Natural Language Processing DLO8013: Adhoc Wireless Network	ILO8021. Project Management ILO8022. Finance Management ILO8023. Entrepreneurship Development and Management ILO8024. Human Resource Management ILO8025. Professional Ethics and CSR ILO8026. Research Methodology ILO8027. IPR and Patenting ILO8028. Digital Business Management ILO8029. Environmental Management

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Under

FACULTY OF TECHNOLOGY

Electronics and Telecommunication Engineering

Third Year with Effect from AY 2018-19

Final Year with Effect from AY 2019-20

As per **Choice Based Credit and Grading System**
with effect from the AY 2016-17



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Semester VI

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned		
		Theory	Pracs	Tut	Theory	TW/ Pracs	Total
ECC601	Microcontrollers & Applications	4	-	--	4	--	4
ECC602	Computer Communication Networks	4	-	-	4	-	4
ECC603	Antenna & Radio Wave Propagation	4	-	-	4	-	4
ECC604	Image Processing and Machine Vision	4	-	--	4	--	4
ECCDLO 602X	Department Level Optional Course II	4	-	-	4	-	4
ECL601	Microcontroller & Applications Lab	-	2	-	-	1	1
ECL602	Computer Communication Network Lab	-	2	-	-	1	1
ECL603	Antenna & Radio Wave Propagation Lab	-	2	-	-	1	1
ECL604	Image Processing and Machine Vision Lab	-	2	-	-	1	1
ECLDLO 602X	Department Level Optional Lab II	-	2	-	-	1	1
Total		20	10	-	20	5	25

Course Code	Course Name	Examination Scheme									
		Theory					End Sem Exam	Exam Duration (Hrs)	TW	Oral & Prac	Total
		Internal Assessment			Avg	End Sem Exam					
		Test1	Test 2	Avg							
ECC601	Microcontroller & Applications	20	20	20	80	03	--	--	100		
ECC602	Computer Communication Network	20	20	20	80	03	--	--	100		
ECC603	Antenna & Radio Wave Propagation	20	20	20	80	03	--	--	100		
ECC604	Image Processing and Machine Vision Lab	20	20	20	80	03	--	--	100		
ECCDLO 602X	Department Level Optional Course II	20	20	20	80	03	--	--	100		
ECL601	Microcontroller & Applications Lab	--	--	--	--	--	25	25	50		
ECL602	Computer Communication Network Lab	--	--	--	--	--	25	25	50		
ECL603	Antenna & Radio Wave Propagation Lab	--	--	--	--	--	25	25	50		
ECL604	Image Processing and Machine Vision Lab	--	--	--	--	--	25	25	50		
ECLDLO 602X	Department Level Optional Lab II	--	--	--	--	--	25	--	25		
Total				100	400		125	100	725		

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Electronics and Telecommunication Engineering

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Final Year with Effect from AY 2019-20

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Semester VII

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned		
		Theory	Pracs	Tut	Theory	TW/ Pracs	Total
ECC701	Microwave Engineering	4	-	-	4	-	4
ECC702	Mobile Communication System	4	-	-	4	-	4
ECC703	Optical Communication	4	-	--	4	-	4
ECCDLO 703X	Department Level Optional Course III	4	-	-	4	-	4
ILO701X	Institute Level Optional Course I	3	-	-	3	-	3
ECL701	Microwave Engineering Lab	-	2	-	-	1	1
ECL702	Mobile Communication System Lab	-	2	-	-	1	1
ECL703	Optical Communication Lab	-	2	-	-	1	1
ECLDLO 703X	Department Level Optional Lab III	-	2	-	-	1	1
ECL704	Project-I	-	6	-	-	3	3
Total		19	14	-	19	7	26

Course Code	Course Name	Examination Scheme							
		Theory					TW	Oral & Prac	Total
		Internal Assessment			End Sem Exam	Exam Duration (Hrs)			
		Test1	Test 2	Avg					
ECC701	Microwave Engineering	20	20	20	80	03	--	--	100
ECC702	Mobile Communication System	20	20	20	80	03	--	--	100
ECC703	Optical Communication	20	20	20	80	03	--	--	100
ECCDLO 703X	Department Level Optional Course III	20	20	20	80	03	--	--	100
ILO701X	Institute Level Optional Course I	20	20	20	80	03	--	--	100
ECL701	Microwave Engineering Lab	--	--	--	--	--	25	25	50
ECL702	Mobile Communication System Lab	--	--	--	--	--	25	25	50
ECL703	Optical Communication Lab	--	--	--	--	--	25	25	50
ECLDLO 703X	Department Level Optional Lab III	--	--	--	--	--	25	25	50
ECL704	Project-I	--	--	--	--	--	50	50	100
Total				100	400		150	150	800


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Course Code	Department Level Optional Course III	Course Code	Institute Level Optional Course I [#]
ECCDLO7031	Neural Networks and Fuzzy Logic	ILO7011	Product Lifecycle Management
ECCDLO7032	Big Data Analytics	ILO7012	Reliability Engineering
ECCDLO7033	Internet Communication Engineering	ILO7013	Management Information System
ECCDLO7034	CMOS Mixed Signal VLSI	ILO7014	Design of Experiments
ECCDLO7035	Embedded System	ILO7015	Operation Research
		ILO7016	Cyber Security and Laws
		ILO7017	Disaster Management and Mitigation Measures
		ILO7018	Energy Audit and Management
		ILO7019	Development Engineering

Common with all branches



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Revised syllabus (Rev- 2016) from Academic Year 2016 -17
Under

FACULTY OF TECHNOLOGY

Electronics and Telecommunication Engineering

Third Year with Effect from AY 2018-19

Final Year with Effect from AY 2019-20

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Semester VIII

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned		
		Theory	Pracs	Tut	Theory	TW/ Pracs	Total
ECC801	RF Design	4	-	--	4	--	4
ECC802	Wireless Networks	4	-	-	4	-	4
ECCDLO 804X	Department Level Optional Course IV	4	-	-	4	-	4
ILO802X	Institute Level Optional Course II	3	-	-	3	-	3
ECL801	RF Design Lab	-	2	-	-	1	1
ECL802	Wireless Networks Lab	-	2	-	-	1	1
ECLDLO 804X	Department Level Optional Lab IV	-	2	-	-	1	1
ECL803	Project-II	-	12	-	-	6	6
Total		15	18	-	15	9	24



Course Code	Course Name	Examination Scheme							
		Theory					TW	Oral & Prac	Total
		Internal Assessment			End Sem Exam	Exam Duration (Hrs)			
		Test1	Test 2	Avg					
ECC801	RF Design	20	20	20	80	03	--	--	100
ECC802	Wireless Networks	20	20	20	80	03	--	--	100
ECCDLO 804X	Department Level Optional Course IV	20	20	20	80	03	--	--	100
ILO802X	Institute Level Optional Course II	20	20	20	80	03	--	--	100
ECL801	RF Design Lab	--	--	--	--	--	25	25	50
ECL802	Wireless Networks Lab	--	--	--	--	--	25	25	50
ECLDLO 804X	Department Level Optional Lab IV	--	--	--	--	--	25	25	50
ECL803	Project-II	--	--	--	--	--	100	50	150
Total				80	320		175	125	700

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Course Code	Department Level Elective Course IV	Course Code	Institute Level Elective Course II [#]
ECCDLO8041	Optical Networks	ILO8021	Project Management
ECCDLO8042	Advanced Digital Signal Processing	ILO8022	Finance Management
ECCDLO8043	Satellite Communication	ILO8023	Entrepreneurship Development and Management
ECCDLO8044	Network management in Telecommunication	ILO8024	Human Resource Management
		ILO8025	Professional Ethics and CSR
		ILO8026	Research Methodology
		ILO8027	IPR and Patenting
		ILO8028	Digital Business Management
		ILO8029	Environmental Management

Common with all branches

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UNIVERSITY OF MUMBAI



Bachelor of Engineering

First Year Engineering (Semester I & II), Revised course (REV-2016)from Academic Year 2061 -17,(Common for All Branches of Engineering)

**(As per Choice Based Credit and Grading System
with effect from the A. Y. 2016 - 17)**

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**First Year Engineering (Semester I & II), Revised course from Academic Year 2016 -17,
(REV- 2016) (Common for all Branches of Engineering)**

Scheme for FE - Semester – I

Sub. Code	Subject Name	Examination Scheme							Total	
		Theory Marks				End sem. exam	Term Work	Pract		Oral
		Internal Assessment								
		Test 1	Test 2	Average of Test 1 & Test 2						
FEC101	Applied Mathematics-I	20	20	20	80	25	-	-	125	
FEC102	Applied Physics-I	15	15	15	60	25	-	-	100	
FEC103	Applied Chemistry –I	15	15	15	60	25	-	-	100	
FEC104	Engineering Mechanics	20	20	20	80	25	-	25	150	
FEC105	Basic Electrical Engineering	20	20	20	80	25	-	25	150	
FEC106	Environmental studies	15	15	15	60	-	-	-	75	
FEL101	Basic Workshop Practice-I	-	-	-	-	50	-	-	50	
				105	420	175		50	750	

Sub Code	Subject Name	Teaching Scheme			Credits Assigned			
		Theory	Pract.	Tut.	Theory	TW/Pract	Tut.	Total
FEC101	Applied Mathematics-I	04	-	01	04		01	05
FEC102	Applied Physics-I	03	01	-	03	0.5	-	3.5
FEC103	Applied Chemistry -I	03	01	-	03	0.5	-	3.5
FEC104	Engineering Mechanics	05	02	-	05	01	-	06
FEC105	Basic Electrical Engineering	04	02	-	04	01	-	05
FEC106	Environmental studies	02	-	-	02	-	-	02
FEL101	Basic Workshop Practice-I	-	04	-	-	02	-	02
		21	10	01	21	05	01	27



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**First Year Engineering (Semester I & II), Revised course from Academic Year 2016 -17,
(REV- 2016) (Common for all Branches of Engineering)**

Scheme for FE - Semester – II

Sub. Code	Subject Name	Examination Scheme							Total	
		Theory marks				End sem. exam	Term Work	Pract.		Oral
		Internal Assessment			Average of Test 1 & Test 2					
		Test 1	Test 2							
FEC201	Applied Mathematics-II	20	20	20	80	25	-	-	125	
FEC202	Applied Physics-II	15	15	15	60	25	-	-	100	
FEC203	Applied Chemistry -II	15	15	15	60	25	-	-	100	
FEC204	Engineering Drawing	15	15	15	60	25	50	-	150	
FEC205	Structured Programming Approach	20	20	20	80	25	25	-	150	
FEC206	Communication Skills	10	10	10	40	25	-	-	75	
FEL201	Basic Workshop Practice-II	-	-	-	-	50	-	-	50	
				95	380	200	75		750	

Subject Code	Subject Name	Teaching Scheme			Credits Assigned			
		Theory	Pract.	Tut.	Theory	TW/Pract	Tut.	Total
FEC201	Applied Mathematics-II	04	-	01	04		01	05
FEC202	Applied Physics-II	03	01	-	03	0.5	-	3.5
FEC203	Applied Chemistry -II	03	01	-	03	0.5		3.5
FEC204	Engineering Drawing	03	04	-	03	02	-	05
FEC205	Structured Programming Approach	04	02	-	04	01	-	05
FEC206	Communication Skills	02	02	-	02	01	-	03
FEL201	Basic Workshop Practice -II	-	04	-	-	02	-	02
		19	14	01	19	07	01	27



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Under

FACULTY OF TECHNOLOGY

Information Technology

Second Year with Effect from AY 2017-18

Third Year with Effect from AY 2018-19

Final Year with Effect from AY 2019-20

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Course Code	Course Name	Examination Scheme								
		Theory					TW	Oral	Oral & Pract	Total
		Internal Assessment			End Sem. Exam	Exam Duration (in Hrs)				
		Test 1	Test 2	Avg.						
ITC601	Software Engineering with Project Management	20	20	20	80	3	-	-	-	100
ITC602	Data Mining and Business Intelligence	20	20	20	80	3	-	-	-	100
ITC603	Cloud Computing & Services	20	20	20	80	3	-	-	-	100
ITC604	Wireless Networks	20	20	20	80	3	-	-	-	100
ITDLO-II	Department Level Optional Course -II	20	20	20	80	3	-	-	-	100
ITL601	Software Design Lab	-	-	-	-	-	25	25	--	50
ITL602	Business Intelligence Lab	-	-	-	-	-	25	25	--	50
ITL603	Cloud Service Design Lab	-	-	-	-	-	25	25	--	50
ITL604	Sensor Network Lab	-	-	-	-	-	25	25	--	50
ITM605	Mini-Project	-	-	-	-	-	25	25	--	50
Total		100	100	100	400	-	125	125	--	750

Department Level Optional Course (DLO)

Every student is required to take one Department Elective Course for Semester VI. Different sets of courses will run in both the semesters. Students can take these courses from the list of department electives, which are closely allied to their disciplines.

(DLO-I subjects will have no Labs only Theory)

Subject Code	Department Level Optional Course (DLO)
Semester VI	
ITDLO6021	Advance Internet Programming
ITDLO6022	Software Architecture
ITDLO6023	Digital Forensics
ITDLO6024	Multimedia Systems
ITDLO6025	Green IT

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Under

FACULTY OF TECHNOLOGY

Information Technology

Second Year with Effect from AY 2017-18

Third Year with Effect from AY 2018-19

Final Year with Effect from AY 2019-20

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Course Code	Course Name	Examination Scheme								
		Theory					TW	Oral	Oral & Pract	Total
		Internal Assessment			End Sem. Exam	Exam Duration (in Hrs)				
		Test 1	Test 2	Avg.						
ITC701	Enterprise Network Design	20	20	20	80	3	-	-	100	
ITC702	Infrastructure Security	20	20	20	80	3	-	-	100	
ITC703	Artificial Intelligence	20	20	20	80	3	-	-	100	
ITDLO-II	Department Level Optional Course -III	20	20	20	80	3	-	-	100	
ILO-I	Institute Level Optional Course-I	20	20	20	80	3	--	-	100	
ITL701	Network Design Lab	-	-	-	-	-	25	25	--	50
ITL702	Advanced Security Lab	-	-	-	-	-	25	25	--	50
ITL703	Intelligence System Lab	--	-	-	-	--	25	25	--	50
ITL704	Android Apps Development Lab						25	25	--	25
ITM705	Project-I	-	-	-	-	-	50	25	--	75
Total		100	100	100	400		150	125	--	750

Department Level Optional Course (DLO)

Every student is required to take one Department Elective Course for Semester VII. Different sets of courses will run in both the semesters. Students can take these courses from the list of department electives, which are closely allied to their disciplines.

(DLO-I subjects will have no Labs only Theory)

Institute Level Optional Course (ILO)

Every student is required to take one Institute Elective Course for Semester VII, which is not closely allied to their disciplines. Different sets of courses will run in the both the semesters.



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Subject Code	Department Level Optional Course (DLO)	Subject Code	Institute Level Optional Course (ILO)
Semester VII			
ITDLO7031	Storage Area Networks	ILO7011	Product Lifecycle Management
ITDLO7032	Mobile Application Development	ILO7012	Reliability Engineering
ITDLO7033	High Performance Computing	ILO7013	Management Information System
ITDLO7034	Software Testing and Quality Assurance	ILO7014	Design of Experiments
ITDLO7035	Soft Computing	ILO7015	Operation Research
		ILO7016	Cyber Security and Laws
		ILO7017	Disaster Management and Mitigation Measures
		ILO7018	Energy Audit and Management
		ILO7019	Development Engineering



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Course Code	Course Name	Examination Scheme								
		Theory					TW	Oral	Oral & Pract	Total
		Internal Assessment			End Sem. Exam	Exam Duration (in				
		Test 1	Test 2	Avg.						
ITC801	Big Data Analytics	20	20	20	80	3	-	-	-	100
ITC802	Internet of Everything	20	20	20	80	3	-	-	-	100
ITDLO-IV	Department Level Optional Course-IV	20	20	20	80	3	-	-	-	100
ILO-II	Institute Level Optional Course-II	20	20	20	80	3	-	-	-	100
ITL801	Big Data Lab						25	25	-	50
ITL802	Internet of Everything Lab	-	-	-	-	-	25	25		50
ITL803	DevOps Lab	-	-	-	-	-	25	--	25	50
ITL804	R Programming Lab	-	-	-	-	-	25	--	25	50
ITM805	Project-II						100	50	--	150
Total		80	80	80	320	--	200	100	50	750

Department Level Optional Course (DLO)

Every student is required to take one Department Elective Course for Semester VIII. Different sets of courses will run in both the semesters. Students can take these courses from the list of department electives, which are closely allied to their disciplines.

(DLO-I subjects will have no Labs only Theory)

Institute Level Optional Course (ILO)

Every student is required to take one Institute Elective Course for Semester VIII, which is not closely allied to their disciplines. Different sets of courses will run in the both the semesters.



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Subject Code	Department Level Optional Course (DLO)	Subject Code	Institute Level Optional Course (ILO)
Semester VIII			
ITDLO8041	User Interaction Design	ILO8021	Project Management
ITDLO8042	Information Retrieval Systems	ILO8022	Finance Management
ITDLO8043	Knowledge Management	ILO8023	Entrepreneurship Development and Management
ITDLO8044	Robotics	ILO8024	Human Resource Management
ITDLO8045	Enterprise Resource Planning	ILO8025	Professional Ethics and CSR
		ILO8026	Research Methodology
		ILO8027	IPR and Patenting
		ILO8028	Digital Business Management
		ILO8029	Environmental Management



Dr. G. T. Thampi
PRINCIPAL
 Thadomal Shahani Engineering College
 Bandra (W), Mumbai - 400 050.



Mumbai University Syllabus Scheme

(Rev-2019)

AC: 29/6/2021

Item No: 6.23

UNIVERSITY OF MUMBAI



Bachelor of Engineering

in

- Artificial Intelligence and Data Science
- Artificial Intelligence and Machine Learning
- Cyber Security
- Internet of Things (IoT)
- Data Engineering
- Computer Science and Engineering (Data Science)
- Computer Science and Engineering (Artificial Intelligence and Machine Learning)
- Computer Science and Engineering (Internet of Things and Cyber Security Including Block Chain Technology)

Second Year with Effect from AY 2021-22

Under

FACULTY OF SCIENCE & TECHNOLOGY

(As per AICTE guidelines with effect from the academic year 2019–2020)

Dr. G. T. Thampi
PRINCIPAL

Thadomal Shahani Engineering College
Bandra (W), Mumbai - 400 050.



Program Structure for Second Year Computer Engineering


UNIVERSITY OF MUMBAI (With Effect from 2020-2021)

Semester III

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned				
		Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total	
CSC301	Engineering Mathematics-III	3	--	1*	3	--	1	4	
CSC302	Discrete Structures and Graph Theory	3	--	--	3	--	--	3	
CSC303	Data Structure	3	--	--	3	--	--	3	
CSC304	Digital Logic & Computer Architecture	3	--	--	3	--	--	3	
CSC305	Computer Graphics	3	--	--	3	--	--	3	
CSL301	Data Structure Lab	--	2	--	--	1	--	1	
CSL302	Digital Logic & Computer Architecture Lab	--	2	--	--	1	--	1	
CSL303	Computer Graphics Lab	--	2	--	--	1	--	1	
CSL304	Skill base Lab course: Object Oriented Programming with Java	--	2+2*	--	--	2	--	2	
CSM301	Mini Project – 1 A	--	4 ^{\$}	--	--	2	--	2	
Total		15	14	1	15	07	1	23	
Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract & oral	Total
		Internal Assessment			End Sem. Exam	Exam. Duration (in Hrs)			
		Test 1	Test 2	Avg					
CSC301	Engineering Mathematics-III	20	20	20	80	3	25	--	125
CSC302	Discrete Structures and Graph Theory	20	20	20	80	3	--	--	100
CSC303	Data Structure	20	20	20	80	3	--	--	100
CSC304	Digital Logic & Computer Architecture	20	20	20	80	3	--	--	100
CSC305	Computer Graphics	20	20	20	80	3	--	--	100
CSL301	Data Structure Lab	--	--	--	--	--	25	25	50
CSL302	Digital Logic & Computer Architecture Lab	--	--	--	--	--	25	--	25
CSL303	Computer Graphics Lab	--	--	--	--	--	25	25	50
CSL304	Skill base Lab course: Object Oriented Programming with Java	--	--	--	--	--	50	25	75
CSM301	Mini Project – 1 A	--	--	--	--	--	25	25	50
Total		--	--	100	400	--	175	100	775

*Should be conducted batch wise and

\$ indicates workload of Learner (Not Faculty), Students can form groups with minimum 2 (Two) and not more than 4 (Four), Faculty Load: 1 hour per week per four groups


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Program Structure for Second Year Computer Engineering

UNIVERSITY OF MUMBAI (With Effect from 2020-2021)

Semester IV

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned				
		Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total	
CSC401	Engineering Mathematics-IV	3	--	1*	3	--	1	4	
CSC402	Analysis of Algorithm	3	--	--	3	--	--	3	
CSC403	Database Management System	3	--	--	3	--	--	3	
CSC404	Operating System	3	--	--	3	--	--	3	
CSC405	Microprocessor	3	--	--	3	--	--	3	
CSL401	Analysis of Algorithm Lab	--	2	--	--	1	--	1	
CSL402	Database Management System Lab	--	2	--	--	1	--	1	
CSL403	Operating System Lab	--	2	--	--	1	--	1	
CSL404	Microprocessor Lab	--	2	--	--	1	--	1	
CSL405	Skill Base Lab Course: Python Programming	--	2*+2	--	--	2	--	2	
CSM401	Mini Project 1-B	--	4 ^{\$}	--	--	2	--	2	
Total		15	16	1	15	7	1	24	
Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract & oral	Total
		Internal Assessment			End Sem. Exam.	Exam. Duration (in Hrs)			
		Test 1	Test 2	Avg.					
CSC401	Engineering Mathematics - IV	20	20	20	80	3	25	--	125
CSC402	Analysis of Algorithm	20	20	20	80	3	--	--	100
CSC403	Database Management System	20	20	20	80	3	--	--	100
CSC404	Operating System	20	20	20	80	3	--	--	100
CSC405	Microprocessor	20	20	20	80	3	--	--	100
CSL401	Analysis of Algorithm Lab	--	--	--	--	--	25	25	50
CSL402	Database Management System Lab	--	--	--	--	--	25	25	50
CSL403	Operating System Lab	--	--	--	--	--	25	25	50
CSL404	Microprocessor Lab	--	--	--	--	--	25	--	25
CSL405	Skill Base Lab Course: Python Programming	--	--	--	--	--	25	--	25
CSM401	Mini Project 1-B	--	--	--	--	--	25	25	50
Total		--	--	100	400	--	175	100	775

*Should be conducted batchwise and

\$ indicates workload of Learner (Not Faculty), Students can form groups with minimum 2 (Two) and not more than 4 (Four), Faculty Load: 1 hour per week per four groups.

Dr. G. T. Thampi
PRINCIPAL

Thadomal Shahani Engineering College
Bandra (W), Mumbai - 400 050.



AC : 23/07/2020

Item No.: 139

UNIVERSITY OF MUMBAI



Bachelor of Engineering

in

Biomedical Engineering

Second Year with Effect from AY 2020-21

Third Year with Effect from AY 2021-22

Final Year with Effect from AY 2022-23

(REV- 2019 'C' Scheme) from Academic Year 2019 – 20

Under

FACULTY OF SCIENCE & TECHNOLOGY

Dr. G. T. Thampi
PRINCIPAL
Thadomal Shahani Engineering College
Bandra (W), Mumbai-400 050.



(As per AICTE guidelines with effect from the academic year
2019–2020)

**Program Structure for Second Year Engineering
Semester III & IV**

**UNIVERSITY OF MUMBAI
(With Effect from 2020-2021)**

Semester III

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned				
		Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total	
BMC301	Engineering Mathematics - III	3	--	1	3	--	1	4	
BMC302	Human Anatomy and Physiology for Engineers	3		--	3		--	3	
BMC303	Medical Sensors	3	--	--	3	--	--	3	
BMC304	Electronic Circuits Analysis and Design	4	--	--	4	--	--	4	
BMC305	Digital Electronics	3	--	--	3	--	--	3	
BML301	Human Anatomy and Physiology for Engineers Lab	--	2	--	--	1	--	1	
BML302	Medical Sensors Lab	--	2	--	--	1	--	1	
BML303	Electronic Circuits Analysis and Design Lab	--	2	--	--	1	--	1	
BML304	Electronics Lab (SBL)	--	4	--	--	2	--	2	
BMM301	Mini Project – 1 A	--	4 ^s	--	--	2	--	2	
Total		16	14	1	16	07	1	24	
Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract/oral	Total
		Internal Assessment			End Sem. Exam	Exam. Duration (in Hrs)			
		Test 1	Test 2	Avg.					
BMC301	Engineering Mathematics - III	20	20	20	80	3	25	--	125
BMC302	Human Anatomy and Physiology for Engineers	20	20	20	80	3	--	--	100
BMC303	Medical Sensors	20	20	20	80	3	--	--	100
BMC304	Electronic Circuits Analysis and Design	20	20	20	80	3	--	--	100
BMC305	Digital Electronics	20	20	20	80	3	--	--	100
BML301	Human Anatomy and Physiology for Engineers Lab	--	--	--	--	--	25	--	25
BML302	Medical Sensors Lab	--	--	--	--	--	25	25	50
BML303	Electronic Circuits Analysis and Design Lab	--	--	--	--	--	25	25	50
BML304	Electronics Lab (SBL)	--	--	--	--	--	25	25	50
BMM301	Mini Project – 1 A	--	--	--	--	--	25	--	25
Total		--	--	100	400	--	150	75	725

\$ indicates work load of Learner (Not Faculty), for Mini Project - 1 A.




Faculty Load :1 hour per week per 4 mini project groups.

Program Structure for Second Year Engineering
UNIVERSITY OF MUMBAI
 (With Effect from 2020-2021)
Semester IV

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned				
		Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total	
BMC401	Engineering Mathematics - IV	3	--	1	3	--	1	4	
BMC402	Integrated Circuit Design	3	--	--	3	--	--	3	
BMC403	Principles of Control Systems	3	--	--	3	--	--	3	
BMC404	Medical Imaging – I	3	--	--	3	--	--	3	
BMC405	Biomaterials and Artificial Organs	3	--	--	3	--	--	3	
BML401	Integrated Circuit Design Lab	--	2	--	--	1	--	1	
BML402	Principles of Control Systems Lab	--	2	--	--	1	--	1	
BML403	Medical Imaging – I Lab	--	2	--	--	1	--	1	
BML404	Computing Lab (SBL)	--	4	--	--	2	--	2	
BMM401	Mini Project – 1 B	--	4 ^{\$}	--	--	2	--	2	
Total		15	14	1	15	7	1	23	
Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract/oral	Total
		Internal Assessment			End Sem. Exam.	Exam. Duration (in Hrs)			
		Test 1	Test 2	Avg.					
BMC401	Engineering Mathematics - IV	20	20	20	80	3	25	--	125
BMC402	Integrated Circuit Design	20	20	20	80	3	--	--	100
BMC403	Principles of Control Systems	20	20	20	80	3	--	--	100
BMC404	Medical Imaging – I	20	20	20	80	3	--	--	100
BMC405	Biomaterials and Artificial Organs	20	20	20	80	3	--	--	100
BML401	Integrated Circuit Design Lab	--	--	--	--	--	25	25	50
BML402	Principles of Control Systems Lab	--	--	--	--	--	25	--	25
BML403	Medical Imaging – I Lab	--	--	--	--	--	25	25	50
BML404	Computing Lab (SBL)	--	--	--	--	--	25	25	50
BMM401	Mini Project – 1 B	--	--	--	--	--	25	25	50
Total		--	--	100	400	--	150	100	750

\$ indicates work load of Learner (Not Faculty), for Mini Project - 1 B.




UNIVERSITY OF MUMBAI



Bachelor of Engineering

in

Biomedical Engineering

Third Year with Effect from AY 2021-22

(REV- 2019 'C' Scheme) from Academic Year 2019 – 20

Under

FACULTY OF SCIENCE & TECHNOLOGY

(As per AICTE guidelines with effect from the academic
year 2019–2020)

Dr. G. T. Thampi
PRINCIPAL

Thadomal Shahani Engineering College
Bandra (W), Mumbai - 400 050.



Program Structure for Third Year Engineering
Semester V & VI
UNIVERSITY OF MUMBAI
(With Effect from 2021-2022)

Semester V

Course Code	Course Name	Teaching Scheme (Contact Hours)		Credits Assigned					
		Theory	Pract.	Theory	Pract.	Total			
BMC501	Biomedical Instrumentation – I	3	--	3	--	3			
BMC502	Digital Signal Processing	3	--	3	--	3			
BMC503	Microcontrollers and Embedded Systems	4	--	4	--	4			
BMC504	Medical Imaging – II	3	--	3	--	3			
BMDO501X	Department Optional Course – 1	3	--	3	--	3			
BML501	Biomedical Instrumentation – I Laboratory	--	2	--	1	1			
BML502	Digital Signal Processing Laboratory	--	2	--	1	1			
BML503	Microcontrollers and Embedded Systems Laboratory	--	2	--	1	1			
BML504	Professional Communication and Ethics – II	--	2*+2	--	2	2			
BMM501	Mini Project – 2 A	--	4 ^s	--	2	2			
Total		16	14	16	07	23			
Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Prac /oral	Total
		Internal Assessment			End Sem Exam	Exam. Duration (in Hrs)			
		Test 1	Test 2	Avg					
BMC501	Biomedical Instrumentation – I	20	20	20	80	3	--	--	100
BMC502	Digital Signal Processing	20	20	20	80	3	--	--	100
BMC503	Microcontrollers and Embedded Systems	20	20	20	80	3	--	--	100
BMC504	Medical Imaging – II	20	20	20	80	3	--	--	100
BMDO501X	Department Optional Course – 1	20	20	20	80	3	--	--	100
BML501	Biomedical Instrumentation – I Laboratory	--	--	--	--	--	25	25	50
BML502	Digital Signal Processing Laboratory	--	--	--	--	--	25	25	50



BML503	Microcontrollers and Embedded Systems Laboratory	--	--	--	--	--	25	25	50
BML504	Professional Communication and Ethics	--	--	--	--	--	25	25	50
BMM501	Mini Project – 2 A	--	--	--	--	--	25	--	25
Total		--	--	100	400	--	125	100	725

* Theory class to be conducted for full class

\$ indicates work load of Learner (Not Faculty), for Mini Project - 2 A

Faculty Load :1 hour per week per 4 mini project groups.

Sem. V: Department Optional Course – 1

BMDO5011: Principles of Communication Engineering

BMDO5012: Very Large Scale Integration

BMDO5013: Tissue Engineering



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Semester VI

Course Code	Course Name	Teaching Scheme (Contact Hours)		Credits Assigned					
		Theory	Pract. /Tut.	Theory	Pract.	Total			
BMC601	Biomedical Instrumentation – II	3	--	3	--	3			
BMC602	Biomedical Digital Image Processing	3	--	3	--	3			
BMC603	Data Analysis in Healthcare	3	--	3	--	3			
BMC604	Biomechanics, Prosthetics and Orthotics	3	1	3	--	4			
BMDO601X	Department Optional Course – 2	3	--	3	--	3			
BML601	Biomedical Instrumentation – II Laboratory	--	2	--	1	1			
BML602	Biomedical Digital Image Processing Laboratory	--	2	--	1	1			
BML603	Data Analysis in Healthcare Laboratory	--	2	--	1	1			
BML604	Patient-care Automation Laboratory	--	4	--	2	2			
BMM601	Mini Project – 2 B	--	4 ^s	--	2	2			
Total		15	15	15	07	23			
Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Prac /oral	Total
		Internal Assessment			End Sem Exam	Exam. Duration (in Hrs)			
		Test 1	Test 2	Avg					
BMC601	Biomedical Instrumentation - II	20	20	20	80	3	--	--	100
BMC602	Biomedical Digital Image Processing	20	20	20	80	3	--	--	100
BMC603	Data Analysis in Healthcare	20	20	20	80	3	--	--	100
BMC604	Biomechanics, Prosthetics and Orthotics	20	20	20	80	3	25	--	125
BMDO601X	Department Optional Course – 2	20	20	20	80	3	--	--	100
BML601	Biomedical Instrumentation – II Laboratory	--	--	--	--	--	25	25	50
BML602	Biomedical Digital Image Processing Laboratory	--	--	--	--	--	25	25	50

BML603	Data Analysis in Healthcare Laboratory	--	--	--	--	--	25	--	25
BML604	Patient-care Automation Laboratory	--	--	--	--	--	25	25	50
BMM601	Mini Project – 2 B	--	--	--	--	--	25	25	50
Total		--	--	100	400	--	150	100	750

\$ indicates work load of Learner (Not Faculty), for Mini Project - 2 B

Faculty Load :1 hour per week per 4 mini project groups.

Sem. VI: Department Optional Course – 2

BMDO6011: Nuclear Medicine

BMDO6012: Advanced Embedded Systems

BMDO6013: Telemedicine

UNIVERSITY OF MUMBAI



Bachelor of Engineering

in

Biomedical Engineering

Third Year with Effect from AY 2021-22

(REV- 2019 'C' Scheme) from Academic Year 2019 – 20

Under

FACULTY OF SCIENCE & TECHNOLOGY

(As per AICTE guidelines with effect from the academic
year 2019–2020)

**Program Structure for Third Year Engineering
Semester V & VI
UNIVERSITY OF MUMBAI
(With Effect from 2021-2022)**

Semester V

Course Code	Course Name	Teaching Scheme (Contact Hours)		Credits Assigned					
		Theory	Pract.	Theory	Pract.	Total			
BMC501	Biomedical Instrumentation – I	3	--	3	--	3			
BMC502	Digital Signal Processing	3	--	3	--	3			
BMC503	Microcontrollers and Embedded Systems	4	--	4	--	4			
BMC504	Medical Imaging – II	3	--	3	--	3			
BMDO501X	Department Optional Course – 1	3	--	3	--	3			
BML501	Biomedical Instrumentation – I Laboratory	--	2	--	1	1			
BML502	Digital Signal Processing Laboratory	--	2	--	1	1			
BML503	Microcontrollers and Embedded Systems Laboratory	--	2	--	1	1			
BML504	Professional Communication and Ethics – II	--	2*+2	--	2	2			
BMM501	Mini Project – 2 A	--	4 ^{\$}	--	2	2			
Total		16	14	16	07	23			
Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Prac /oral	Total
		Internal Assessment			End Sem Exam	Exam. Duration (in Hrs)			
		Test 1	Test 2	Avg					
BMC501	Biomedical Instrumentation – I	20	20	20	80	3	--	--	100
BMC502	Digital Signal Processing	20	20	20	80	3	--	--	100
BMC503	Microcontrollers and Embedded Systems	20	20	20	80	3	--	--	100
BMC504	Medical Imaging – II	20	20	20	80	3	--	--	100
BMDO501X	Department Optional Course – 1	20	20	20	80	3	--	--	100
BML501	Biomedical Instrumentation – I Laboratory	--	--	--	--	--	25	25	50
BML502	Digital Signal Processing Laboratory	--	--	--	--	--	25	25	50

BML503	Microcontrollers and Embedded Systems Laboratory	--	--	--	--	--	25	25	50
BML504	Professional Communication and Ethics	--	--	--	--	--	25	25	50
BMM501	Mini Project – 2 A	--	--	--	--	--	25	--	25
Total		--	--	100	400	--	125	100	725

* Theory class to be conducted for full class

\$ indicates work load of Learner (Not Faculty), for Mini Project - 2 A

Faculty Load :1 hour per week per 4 mini project groups.

Sem. V: Department Optional Course – 1

BMDO5011: Principles of Communication Engineering

BMDO5012: Very Large Scale Integration

BMDO5013: Tissue Engineering

UNIVERSITY OF MUMBAI



Bachelor of Engineering

in

Chemical Engineering

Second Year with Effect from AY 2020-21

Third Year with Effect from AY 2021-22

Final Year with Effect from AY 2022-23

(REV- 2019 'C' Scheme) from Academic Year 2019 – 20

Under

FACULTY OF SCIENCE & TECHNOLOGY

(As per AICTE guidelines with effect from the academic year
2019–2020)

University of Mumbai

Program Structure for B.E. Chemical Engineering (Revised 2020-2021)

Semester III

Course code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			Total
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	
CHC301	Engineering Mathematics-III	3	-	1	3	-	1	4
CHC302	Industrial and Engineering Chemistry I	3	-	-	3	-	-	3
CHC303	Fluid Flow Operations	3	-	-	3	-	-	3
CHC304	Chemical Engineering Thermodynamics I	3	-	-	3	-	-	3
CHC305	Process Calculations	3	-	-	3	-	-	3
CHL301	Industrial and Engineering Chemistry I Lab	-	3	-	-	1.5	-	1.5
CHL302	Fluid Flow Operation Lab	-	3	-	-	1.5	-	1.5
CHL303	Basic Chemical Engineering Lab	-	3	-	-	1.5	-	1.5
CHL304	Skilled Based Lab: Chemical Technology Lab	-	2*2	-	-	2	-	2
CHM301	Mini Project 1A	-	3#	-	-	1.5	-	1.5
Total		15	16	1	15	8	1	24

Course code	Course Name	Examination Scheme								
		Theory					Term Work	Pract/ Oral	Oral	Total
		Internal Assessment			End Sem Exam	Exam Duration (in hrs)				
		Test 1	Test 2	Avg						
CHC301	Engineering Mathematics-III	20	20	20	80	3	25	-	-	125
CHC302	Industrial and Engineering Chemistry I	20	20	20	80	3	-	-	-	100
CHC303	Fluid Flow Operations	20	20	20	80	3	-	-	-	100
CHC304	Chemical Engineering Thermodynamics I	20	20	20	80	3	-	-	-	100
CHC305	Process Calculations	20	20	20	80	3	-	-	-	100
CHL301	Industrial and Engineering Chemistry I Lab	-	-	-	-	3	25	25	-	50
CHL302	Fluid Flow Operation Lab	-	-	-	-	3	25	25	-	50
CHL303	Basic Chemical Engineering Lab	-	-	-	-	-	25	-	25	50
CHL304	Skilled Based Lab: Chemical Technology Lab	-	-	-	-	-	25	-	25	50
CHM301	Mini Project 1A	-	-	-	-	-	25	-	25	50
Total		-	-	100	400	-	150	50	75	775

*Indicates Theory class to be conducted for full class

indicates work load of Learner (Not Faculty), for Mini Project;
Faculty load: 1 hour per week per four groups, for Mini Project

University of Mumbai
Program Structure for B.E. Chemical Engineering (Revised 2020-2021)
Semester IV

Course code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			Total
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	
CHC401	Engineering Mathematics-IV	3	-	1	3	-	1	4
CHC402	Industrial and Engineering Chemistry II	3	-	-	3	-	-	3
CHC403	Numerical Method in Chemical Engineering	3	-	-	3	-	-	3
CHC404	Solid Fluid Mechanical Operations	3	-	-	3	-	-	3
CHC405	Chemical Engineering Thermodynamics II	3	-	-	3	-	-	3
CHL401	Industrial and Engineering Chemistry II Lab	-	3	-	-	1.5	-	1.5
CHL402	Numerical Method in Chemical Engineering Lab	-	3	-	-	1.5	-	1.5
CHL403	Solid Fluid Mechanical Operation Lab	-	3	-	-	1.5	-	1.5
CHL404	Skilled based lab: Design Calculation of Auxiliary Plant Equipment	-	3	-	-	1.5	-	1.5
CHM401	Mini Project 1B	-	2#	--	-	1	-	1
	Total	15	14	1	15	7	1	23

Course code	Course Name	Examination Scheme								Total
		Theory					Term Work	Pract/Oral	Oral	
		Internal Assessment			End Sem Exam	Exam Duration (in hrs)				
		Test 1	Test 2	Avg						
CHC401	Engineering Mathematics-IV	20	20	20	80	3	25	-	-	125
CHC402	Industrial and Engineering Chemistry II	20	20	20	80	3	-	-	-	100
CHC403	Numerical Method in Chemical Engineering	20	20	20	80	3	-	-	-	100
CHC404	Solid Fluid Mechanical Operations	20	20	20	80	3	-	-	-	100
CHC405	Chemical Engineering Thermodynamics II	20	20	20	80	3	-	-	-	100
CHL401	Industrial and Engineering Chemistry II Lab	-	-	-	-	3	25	25	-	50
CHL402	Numerical Method in Chemical Engineering Lab	-	-	-	-	-	25	-	25	50
CHL403	Solid Fluid Mechanical Operation Lab	-	-	-	-	3	25	25	-	50
CHL404	Skilled based lab: Design Calculation of Auxiliary Plant Equipment	-	-	-	-	-	25	-	25	50
CHM401	Mini Project 1B	-	-	-	-	-	25	-	25	50
	Total	-	-	100	400	-	150	50	75	775

indicates work load of Learner (Not Faculty), for Mini Project
 faculty load : 1 hour per week per four groups, for Mini Project

AC- 29/06/2021
Item No.: 6.3

UNIVERSITY OF MUMBAI



Bachelor of Engineering

in

Chemical Engineering

Third Year Syllabus with Effect from AY 2021-22

(REV- 2019 'C' Scheme) from Academic Year 2019 – 2020

Under

FACULTY OF SCIENCE & TECHNOLOGY

(As per AICTE guidelines with effect from the academic
year 2019–2020)

University of Mumbai
Program Structure for B.E. Chemical Engineering (Revised 2019) wef 2021-2022
Semester V

Course code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			Total
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	
CHC501	Mass transfer Operations-I	3	-	-	3	-	-	3
CHC502	Heat transfer Operations	3	-	-	3	-	-	3
CHC503	Chemical Reaction Engineering-I	3	-	-	3	-	-	3
CHC504	Transport Phenomena	3	-	-	3	-	-	3
CHDO501X	Department Optional Course 1	3	-	-	3	-	-	3
CHL501	Mass transfer Operations-I Lab	-	3	-	-	1.5	-	1.5
CHL502	Heat transfer Operations Lab	-	3	-	-	1.5	-	1.5
CHL503	Chemical Reaction Engineering-I Lab	-	3	-	-	1.5	-	1.5
CHL504	Skilled Based Lab: Professional Communication and Ethics II Lab	-	2*2	-	-	2	-	2
CHM501	Mini Project-2A	-	3#	-	-	1.5	-	1.5
	Total	15	14	-	15	8	-	23

Course code	Course Name	Examination Scheme								
		Theory					Term Work	Pract /Oral	Oral	Total
		Internal Assessment			End Sem Exam	Exam Duration (in hrs)				
Test 1	Test 2	Avg								
CHC501	Mass transfer Operations-I	20	20	20	80	3	-	-	-	100
CHC502	Heat transfer Operations	20	20	20	80	3	-	-	-	100
CHC503	Chemical Reaction Engineering-I	20	20	20	80	3	-	-	-	100
CHC504	Transport Phenomena	20	20	20	80	3	-	-	-	100
CHDO501X	Department Optional Course 1	20	20	20	80	3	-	-	-	100
CHL501	Mass transfer Operations-I Lab	-	-	-	-	3	25	25	-	50
CHL502	Heat transfer Operations Lab	-	-	-	-	3	25	25	-	50
CHL503	Chemical Reaction Engineering-I Lab	-	-	-	-	3	25	25	-	50
CHL504	Skilled Based Lab: Professional Communication and Ethics II Lab	-	-	-	-	-	25	-	25	50
CHM501	Mini Project-2A	-	-	-	-	-	25	-	25	50
	Total			100	400	-	125	75	50	750

Department Optional Course 1 (Semester V)

Engineering Stream (Elective Code)	Technology Stream (Elective Code)	Management Stream
Food Engineering(CHDO5011)	Advanced Material Sciences (CHDO5012)	Total Quality Management (CHDO5013)

*Indicates Theory class to be conducted for full class;

indicates work load of Learner (Not Faculty), for mini project.

For mini project faculty load: 1 hour per week per four groups

University of Mumbai
Program Structure for B.E. Chemical Engineering (Revised 2021-2022)
T.E Semester VI

Course code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			Total
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	
CHC601	Mass Transfer Operation II	3	-	-	3	-	-	3
CHC602	Chemical Reaction Engineering II	3	-	-	3	-	-	3
CHC603	Pollution Control Technology	3	-	-	3	-	-	3
CHC604	Process Engineering and Economics	3	-	1	3	-	1	4
CHDO602X	Departmental Optional Course 2	3	-	-	3	-	-	3
CHL601	Mass Transfer Operation II Lab	-	3	-	-	1.5	-	1.5
CHL602	Chemical Reaction Engineering II Lab	-	3	-	-	1.5	-	1.5
CHL603	Pollution Control Technology Lab	-	3	-	-	1.5	-	1.5
CHL604	Skilled Based Lab: Piping Design Engineering Lab	-	3	-	-	1.5	-	1.5
CHM601	Mini Project – 2B	-	2#	-	-	1	-	1
	Total	15	14	1	15	7	1	23

Course code	Course Name	Examination Scheme								
		Theory					Term Work	Pract/ Oral	Oral	Total
		Internal Assessment			End Sem. Exam	Exam Duration (in Hrs.)				
		Test 1	Test 2	Avg						
CHC601	Mass Transfer Operation II	20	20	20	80	3	-	-	-	100
CHC602	Chemical Reaction Engineering II	20	20	20	80	3	-	-	-	100
CHC603	Pollution Control Technology	20	20	20	80	3	-	-	-	100
CHC604	Process Engineering and Economics	20	20	20	80	3	25	-	-	125
CHDO602X	Departmental Optional Course 2	20	20	20	80	3	-	-	-	100
CHL601	Mass Transfer Operation II Lab	-	-	-	-	3	25	25	-	50
CHL602	Chemical Reaction Engineering II Lab	-	-	-	-	3	25	25	-	50
CHL603	Pollution Control Technology Lab	-	-	-	-	3	25	25	-	50
CHL604	Skilled Based Lab: Piping Design Engineering Lab	-	-	-	-	-	25	-	25	50
CHM601	Mini Project – 2B	-	-	-	-	-	25	-	25	50
	Total			100	400	-	150	75	50	775

Department Optional Course 2 (Semester VI)

Engineering Stream (Elective Code)	Technology Stream (Elective Code)	Management Stream (Elective Code)
Piping Engineering (CHDO6021)	Polymer Technology (CHDO6022)	Industrial Organization and Management (CHDO6023)

indicates work load of Learner (Not Faculty), for Mini Project; For mini project faculty load: 1 hour per week per four groups

UNIVERSITY OF MUMBAI



Bachelor of Engineering

in

Computer Engineering

Second Year with Effect from AY 2020-21

Third Year with Effect from AY 2021-22

Final Year with Effect from AY 2022-23

(REV- 2019 'C' Scheme) from Academic Year 2019 – 20

Under

FACULTY OF SCIENCE & TECHNOLOGY

(As per AICTE guidelines with effect from the academic year 2019–2020)

Program Structure for Second Year Computer Engineering
UNIVERSITY OF MUMBAI (With Effect from 2020-2021)
Semester III

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned				
		Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total	
CSC301	Engineering Mathematics-III	3	--	1*	3	--	1	4	
CSC302	Discrete Structures and Graph Theory	3	--	--	3	--	--	3	
CSC303	Data Structure	3	--	--	3	--	--	3	
CSC304	Digital Logic & Computer Architecture	3	--	--	3	--	--	3	
CSC305	Computer Graphics	3	--	--	3	--	--	3	
CSL301	Data Structure Lab	--	2	--	--	1	--	1	
CSL302	Digital Logic & Computer Architecture Lab	--	2	--	--	1	--	1	
CSL303	Computer Graphics Lab	--	2	--	--	1	--	1	
CSL304	Skill base Lab course: Object Oriented Programming with Java	--	2+2*	--	--	2	--	2	
CSM301	Mini Project – 1 A	--	4 ^{\$}	--	--	2	--	2	
Total		15	14	1	15	07	1	23	
Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract & oral	Total
		Internal Assessment			End Sem. Exam	Exam. Duration (in Hrs)			
		Test 1	Test2	Avg					
CSC301	Engineering Mathematics-III	20	20	20	80	3	25	--	125
CSC302	Discrete Structures and Graph Theory	20	20	20	80	3	--	--	100
CSC303	Data Structure	20	20	20	80	3	--	--	100
CSC304	Digital Logic & Computer Architecture	20	20	20	80	3	--	--	100
CSC305	Computer Graphics	20	20	20	80	3	--	--	100
CSL301	Data Structure Lab	--	--	--	--	--	25	25	50
CSL302	Digital Logic & Computer Architecture Lab	--	--	--	--	--	25	--	25
CSL303	Computer Graphics Lab	--	--	--	--	--	25	25	50
CSL304	Skill base Lab course: Object Oriented Programming with Java	--	--	--	--	--	50	25	75
CSM301	Mini Project – 1 A	--	--	--	--	--	25	25	50
Total		--	--	100	400	--	175	100	775

*Should be conducted batch wise and

\$ indicates workload of Learner (Not Faculty), Students can form groups with minimum 2 (Two) and not more than 4 (Four), Faculty Load: 1 hour per week per four groups

Program Structure for Second Year Computer Engineering
UNIVERSITY OF MUMBAI (With Effect from 2020-2021)

Semester IV

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned				
		Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total	
CSC401	Engineering Mathematics-IV	3	--	1*	3	--	1	4	
CSC402	Analysis of Algorithm	3	--	--	3	--	--	3	
CSC403	Database Management System	3	--	--	3	--	--	3	
CSC404	Operating System	3	--	--	3	--	--	3	
CSC405	Microprocessor	3	--	--	3	--	--	3	
CSL401	Analysis of Algorithm Lab	--	2	--	--	1	--	1	
CSL402	Database Management System Lab	--	2	--	--	1	--	1	
CSL403	Operating System Lab	--	2	--	--	1	--	1	
CSL404	Microprocessor Lab	--	2	--	--	1	--	1	
CSL405	Skill Base Lab Course: Python Programming	--	2*+2	--	--	2	--	2	
CSM401	Mini Project 1-B	--	4 [§]	--	--	2	--	2	
Total		15	16	1	15	7	1	24	
Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract & oral	Total
		Internal Assessment			End Sem. Exam.	Exam. Duration (in Hrs)			
		Test 1	Test 2	Avg.					
CSC401	Engineering Mathematics-IV	20	20	20	80	3	25	--	125
CSC402	Analysis of Algorithm	20	20	20	80	3	--	--	100
CSC403	Database Management System	20	20	20	80	3	--	--	100
CSC404	Operating System	20	20	20	80	3	--	--	100
CSC405	Microprocessor	20	20	20	80	3	--	--	100
CSL401	Analysis of Algorithm Lab	--	--	--	--	--	25	25	50
CSL402	Database Management System Lab	--	--	--	--	--	25	25	50
CSL403	Operating System Lab	--	--	--	--	--	25	25	50
CSL404	Microprocessor Lab	--	--	--	--	--	25	--	25
CSL405	Skill Base Lab Course: Python Programming	--	--	--	--	--	25	--	25
CSM401	Mini Project 1-B	--	--	--	--	--	25	25	50
Total		--	--	100	400	--	175	100	775

*Should be conducted batchwise and

§ indicates workload of Learner (Not Faculty), Students can form groups with minimum 2 (Two) and not more than 4 (Four), Faculty Load: 1 hour per week per four groups.

AC: 29/06/2021

Item No: 6.15

UNIVERSITY OF MUMBAI



Bachelor of Engineering

in

Computer Engineering

Second Year with Effect from AY 2020-21

Third Year with Effect from AY 2021-22

Final Year with Effect from AY 2022-23

(REV- 2019 'C' Scheme) from Academic Year 2019 – 20

Under

FACULTY OF SCIENCE & TECHNOLOGY

(As per AICTE guidelines with effect from the academic year 2019–2020)

Program Structure for Third Year Computer Engineering
UNIVERSITY OF MUMBAI (With Effect from 2021-2022)

Semester V

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned				
		Theory	Pract.		Theory	Pract.	Total		
CSC501	Theoretical Computer Science	3	--		3	--	3		
CSC502	Software Engineering	3	--		3		3		
CSC503	Computer Network	3	--		3	--	3		
CSC504	Data Warehousing & Mining	3	--		3	--	3		
CSDLO501x	Department Level Optional Course- 1	3	--		3	--	3		
CSL501	Software Engineering Lab	--	2		--	1	1		
CSL502	Computer Network Lab	--	2		--	1	1		
CSL503	Data Warehousing & Mining Lab	--	2		--	1	1		
CSL504	Professional Comm. & Ethics II	--	2*+2		--	2	2		
CSM501	Mini Project: 2 A	--	4 ^{\$}		--	2	2		
Total		15	14		15	07	22		
Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract & oral	Total
		Internal Assessment			End Sem Exam	Exam. Duration (in Hrs)			
		Test 1	Test 2	Avg					
CSC501	Theoretical Computer Science	20	20	20	80	3	25	--	125
CSC502	Software Engineering	20	20	20	80	3	--	--	100
CSC503	Computer Network	20	20	20	80	3	--	--	100
CSC504	Data Warehousing & Mining	20	20	20	80	3	--	--	100
CSDLO501x	Department Level Optional Course -1	20	20	20	80	3	--	--	100
CSL501	Software Engineering Lab	--	--	--	--	--	25	25	50
CSL502	Computer Network Lab	--	--	--	--	--	25	25	50
CSL503	Data Warehousing & Mining Lab	--	--	--	--	--	25	25	50
CSL504	Professional Comm. & Ethics II	--	--	--	--	--	50	--	50
CSM501	Mini Project : 2A	--	--	--	--	--	25	25	50
Total		--	--	100	400	--	175	100	775

* Theory class to be conducted for full class and \$ indicates workload of Learner (Not Faculty), students can form groups with minimum 2(Two) and not more than 4(Four). Faculty Load: 1hour per week per four groups.

**Program Structure for Third Year Computer Engineering
UNIVERSITY OF MUMBAI (With Effect from 2021-2022)**

Semester VI

Course Code	Course Name	Teaching Scheme (Contact Hours)		Credits Assigned					
		Theory	Pract. Tut.	Theory	Pract.	Total			
CSC601	System Programming & Compiler Construction	3	--	3	--	3			
CSC602	Cryptography & System Security	3	--	3	--	3			
CSC603	Mobile Computing	3	--	3	--	3			
CSC604	Artificial Intelligence	3	--	3	--	3			
CSDLO601x	Department Level Optional Course -2	3	--	3	--	3			
CSL601	System Programming & Compiler Construction Lab	--	2	--	1	1			
CSL602	Cryptography & System Security Lab	--	2	--	1	1			
CSL603	Mobile Computing Lab	--	2	--	1	1			
CSL604	Artificial Intelligence Lab	--	2	--	1	1			
CSL605	Skill base Lab Course: Cloud Computing	--	4	--	2	2			
CSM601	Mini Project Lab: 2B	--	4 ^s	--	2	2			
Total		15	16	15	08	23			
Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract. & oral	Total
		Internal Assessment			End Sem Exam	Exam. Duration (in Hrs)			
		Test 1	Test 2	Avg					
CSC601	System Programming & Compiler Construction	20	20	20	80	3	--	--	100
CSC602	Cryptography & System Security	20	20	20	80	3	--	--	100
CSC603	Mobile Computing	20	20	20	80	3	--	--	100
CSC604	Artificial Intelligence	20	20	20	80	3	--	--	100
CSDLO601x	Department Level Optional Course -2	20	20	20	80	3	--	--	100
CSL601	System Programming & Compiler Construction Lab	--	--	--	--	--	25	25	50
CSL602	Cryptography & System Security Lab	--	--	--	--	--	25	--	25
CSL603	Mobile Computing Lab	--	--	--	--	--	25	-	25
CSL604	Artificial Intelligence Lab	--	--	--	--	--	25	25	50
CSL605	Skill base Lab Course: Cloud Computing	--	--	--	--	--	50	25	75
CSM601	Mini Project :2B	--	--	--	--	--	25	25	50
Total		--	--	100	400	--	175	100	775

Program Structure for Computer Engineering
UNIVERSITY OF MUMBAI (With Effect from 2021-2022)

Department Optional Courses

Department Level Optional Courses	Semester	Code & Course
Department Level Optional Course -1	V	CSDLO5011: Probabilistic Graphical Models CSDLO5012: Internet Programming CSDLO5013: Advance Database Management System
Department Level Optional Course -2	VI	CSDLO6011: Internet of Things CSDLO6012: Digital Signal & Image Processing CSDLO6013: Quantitative Analysis

AC: 29/06/2021

Item No: 6.15

UNIVERSITY OF MUMBAI



Bachelor of Engineering

in

Computer Engineering

Second Year with Effect from AY 2020-21

Third Year with Effect from AY 2021-22

Final Year with Effect from AY 2022-23

(REV- 2019 'C' Scheme) from Academic Year 2019 – 20

Under

FACULTY OF SCIENCE & TECHNOLOGY

(As per AICTE guidelines with effect from the academic year 2019–2020)

Program Structure for Third Year Computer Engineering
UNIVERSITY OF MUMBAI (With Effect from 2021-2022)

Semester V

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned				
		Theory	Pract.		Theory	Pract.	Total		
CSC501	Theoretical Computer Science	3	--		3	--	3		
CSC502	Software Engineering	3	--		3		3		
CSC503	Computer Network	3	--		3	--	3		
CSC504	Data Warehousing & Mining	3	--		3	--	3		
CSDLO501x	Department Level Optional Course- 1	3	--		3	--	3		
CSL501	Software Engineering Lab	--	2		--	1	1		
CSL502	Computer Network Lab	--	2		--	1	1		
CSL503	Data Warehousing & Mining Lab	--	2		--	1	1		
CSL504	Business Comm. & Ethics II	--	2*+2		--	2	2		
CSM501	Mini Project: 2 A	--	4 ^{\$}		--	2	2		
Total		15	14		15	07	22		
Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract & oral	Total
		Internal Assessment			End Sem Exam	Exam. Duration (in Hrs)			
		Test 1	Test 2	Avg					
CSC501	Theoretical Computer Science	20	20	20	80	3	25	--	125
CSC502	Software Engineering	20	20	20	80	3	--	--	100
CSC503	Computer Network	20	20	20	80	3	--	--	100
CSC504	Data Warehousing & Mining	20	20	20	80	3	--	--	100
CSDLO501x	Department Level Optional Course -1	20	20	20	80	3	--	--	100
CSL501	Software Engineering Lab	--	--	--	--	--	25	25	50
CSL502	Computer Network Lab	--	--	--	--	--	25	25	50
CSL503	Data Warehousing & Mining Lab	--	--	--	--	--	25	25	50
CSL504	Business Comm. & Ethics II	--	--	--	--	--	50	--	50
CSM501	Mini Project : 2A	--	--	--	--	--	25	25	50
Total		--	--	100	400	--	175	100	775

* Theory class to be conducted for full class and \$ indicates workload of Learner (Not Faculty), students can form groups with minimum 2(Two) and not more than 4(Four). Faculty Load: 1hour per week per four groups.

Program Structure for Computer Engineering
UNIVERSITY OF MUMBAI (With Effect from 2021-2022)

Department Optional Courses

Department Level Optional Courses	Semester	Code & Course
Department Level Optional Course -1	V	CSDLO5011: Probabilistic Graphical Models CSDLO5012: Internet Programming CSDLO5013: Advance Database Management System

UNIVERSITY OF MUMBAI



Bachelor of Engineering

in

Electronics and Telecommunication Engineering

Second Year with Effect from AY 2020-21

Third Year with Effect from AY 2021-22

Final Year with Effect from AY 2022-23

(REV- 2019 'C' Scheme) from Academic Year 2019 – 20

Under

FACULTY OF SCIENCE & TECHNOLOGY

(As per AICTE guidelines with effect from the academic year
2019–2020)

Program Structure for Second Year Engineering
Semester III & IV
UNIVERSITY OF MUMBAI
(With Effect from 2020-2021)
Semester III

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total
ECC301	Engineering Mathematics-III	3	--	1*	3	--	1	4
ECC302	Electronic Devices & Circuits	3	--	--	3	--	--	3
ECC303	Digital System Design	3	--	--	3	--	--	3
ECC304	Network Theory	3	--	1	3	--	1	4
ECC305	Electronic Instrumentation & Control Systems	3	--	--	3	--	--	3
ECL301	Electronic Devices & Circuits Lab	--	2	--	--	1	--	1
ECL302	Digital System Design Lab	--	2	--	--	1	--	1
ECL303	Electronic Instrumentation & Control Systems Lab	--	2	--	--	1	--	1
ECL304	Skill Lab: C++ and Java Programming	--	4	--	--	2	--	2
ECM301	Mini Project 1A	--	4 ^{\$}	--	--	2	--	2
Total		15	14	2	15	07	2	24

* Should be conducted batch wise.

\$ Indicates work load of a learner (Not Faculty) for Mini Project 1A. Faculty Load: 1 hour per week per four groups.

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract. & oral	Total
		Internal Assessment			End Sem. Exam	Exam. Duration (in Hrs)			
		Test 1	Test 2	Avg.					
ECC301	Engineering Mathematics-III	20	20	20	80	3	25	--	125
ECC302	Electronic Devices & Circuits	20	20	20	80	3	--	--	100
ECC303	Digital System Design	20	20	20	80	3	--	--	100
ECC304	Network Theory	20	20	20	80	3	25	--	125
ECC305	Electronic Instrumentation & Control Systems	20	20	20	80	3	--	--	100
ECL301	Electronic Devices & Circuits Lab	--	--	--	--	--	25	25	50
ECL302	Digital System Design Lab	--	--	--	--	--	25	--	25
ECL303	Electronic Instrumentation & Control Systems Lab	--	--	--	--	--	25	--	25
ECL304	Skill Lab: C++ and Java Programming	--	--	--	--	--	25	25	50
ECM301	Mini Project 1A	--	--	--	--	--	25	25	50
Total		--	--	100	400	--	175	75	750

Semester IV

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total
ECC401	Engineering Mathematics-IV	3	--	1*	3	--	1	4
ECC402	Microcontrollers	3	--	--	3	--	--	3
ECC403	Linear Integrated Circuits	3	--	--	3	--	--	3
ECC404	Signals & Systems	3	--	1	3	--	1	4
ECC405	Principles of Communication Engineering	3	--	--	3	--	--	3
ECL401	Microcontrollers Lab	--	2	--	--	1	--	1
ECL402	Linear Integrated Circuits Lab	--	2	--	--	1	--	1
ECL403	Principles of Communication Engineering Lab	--	2	--	--	1	--	1
ECL404	Skill Lab: Python Programming	--	4	--	--	2	--	2
ECM401	Mini Project 1B	--	4 ^s	--	--	2	--	2
Total		15	14	2	15	7	2	24

* Should be conducted batch wise.

§ Indicates work load of a learner (Not Faculty) for Mini Project 1B. Faculty Load: 1 hour per week per four groups.

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract. & oral	Total
		Internal Assessment			End Sem. Exam.	Exam. Duration (in Hrs)			
		Test 1	Test 2	Avg.					
ECC401	Engineering Mathematics-IV	20	20	20	80	3	25	--	125
ECC402	Microcontrollers	20	20	20	80	3	--	--	100
ECC403	Linear Integrated Circuits	20	20	20	80	3	--	--	100
ECC404	Signals & Systems	20	20	20	80	3	25	--	125
ECC405	Principles of Communication Engineering	20	20	20	80	3	--	--	100
ECL401	Microcontrollers Lab	--	--	--	--	--	25	--	25
ECL402	Linear Integrated Circuits Lab	--	--	--	--	--	25	25	50
ECL403	Principles of Communication Engineering Lab	--	--	--	--	--	25	25	50
ECL404	Skill Lab: Python Programming	--	--	--	--	--	25	25	50
ECM401	Mini Project 1B	--	--	--	--	--	25	25	50
Total		--	--	100	400	--	175	100	775

UNIVERSITY OF MUMBAI



Bachelor of Engineering

in

Electronics and Telecommunication Engineering

Second Year with Effect from AY 2020-21

Third Year with Effect from AY 2021-22

Final Year with Effect from AY 2022-23

(REV- 2019 'C' Scheme) from Academic Year 2019 – 20

Under

FACULTY OF SCIENCE & TECHNOLOGY

(As per AICTE guidelines with effect from the academic year
2019–2020)

Program Structure for Third Year Engineering

Semester V & VI

UNIVERSITY OF MUMBAI

(With Effect from 2021-2022)

Semester V

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total
ECC501	Digital Communication	3	--	--	3	--	--	3
ECC502	Discrete Time Signal Processing	3	--	--	3	--	--	3
ECC503	Digital VLSI	3	--	--	3	--	--	3
ECC504	Random Signal Analysis	3	--	1	3	--	1	4
ECCDLO 501X	Department Optional Course-1	3	--	--	3	--	--	3
ECL501	Digital Communication Lab	--	2	--	--	1	--	1
ECL502	Discrete Time Signal Processing Lab	--	2	--	--	1	--	1
ECL503	Digital VLSI Lab	--	2	--	--	1	--	1
ECL504	Professional Communication & Ethics - II	--	2*+2~	--	--	2	--	2
ECM501	Mini Project 2A- Embedded System Project	--	4 ^{\$}	--	--	2	--	2
Total		15	14	1	15	07	1	23

* Theory should be conducted for the full class.

~ Batch-wise practical's to be conducted

\$ Indicates work load of a learner (Not Faculty) for Mini Project 2A. Faculty Load: 1 hour per week per four groups.

Course Code	Course Name	Examination Scheme							Total
		Theory					Term Work	Pract. & oral	
		Internal Assessment			End Sem. Exam	Exam. Duration (in Hrs)			
		Test 1	Test 2	Avg.					
ECC501	Digital Communication	20	20	20	80	3	--	--	100
ECC502	Discrete Time Signal Processing	20	20	20	80	3	--	--	100
ECC503	Digital VLSI	20	20	20	80	3	--	--	100
ECC504	Random Signal Analysis	20	20	20	80	3	25	--	125
ECCDLO 501X	Department Level Optional Course-1	20	20	20	80	3	--	--	100
ECL501	Digital Communication Lab	--	--	--	--	--	25	25	50
ECL502	Discrete Time Signal Processing Lab	--	--	--	--	--	25	25	50
ECL503	Digital VLSI Lab	--	--	--	--	--	25	25	50
ECL504	Business Communication and Ethics Lab	--	--	--	--	--	25	25	50
ECM501	Mini Project 2A- Embedded System Project	--	--	--	--	--	25	25	50
Total		--	--	100	400	--	150	125	775

Department Level Optional Course-1

Course Code	Department Level Optional Course-1
ECCDLO5011	Digital and IPTV Engineering
ECCDLO5012	Data Compression and Cryptography
ECCDLO5013	IT Infra and Security
ECCDLO5014	Data Structures and Algorithm
ECCDLO5015	Sensor Technology

Semester VI

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total
ECC601	Electromagnetics and Antenna	3	--	--	3	--	--	3
ECC602	Computer Communication Networks	3	--	--	3	--	--	3
ECC603	Image Processing and Machine Vision	3	--	--	3	--	--	3
ECC604	Artificial Neural Network and Fuzzy Logic	3	--	--	3	--	--	3
ECCDLO 601X	Department Level Optional Course-2	3	--	--	3	--	--	3
ECL601	Electromagnetics and Antenna Lab	--	2	--	--	1	--	1
ECL602	Computer Communication Networks Lab	--	2	--	--	1	--	1
ECL603	Image Processing and Machine Vision Lab	--	2	--	--	1	--	1
ECL604	Skill Lab: Linux and Networking and Server Configuration	--	4	--	--	2	--	2
ECM601	Mini Project 2B- FPGA based Project	--	4 [§]	--	--	2	--	2
Total		15	14	--	15	07	--	22

§ Indicates work load of a learner (Not Faculty) for Mini Project 2B. Faculty Load: 1 hour per week per four groups.

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract. & oral	Total
		Internal Assessment			End Sem. Exam.	Exam. Duration (in Hrs)			
		Test 1	Test 2	Avg.					
ECC601	Electromagnetics and Antenna	20	20	20	80	3	--	--	100
ECC602	Computer Communication Networks	20	20	20	80	3	--	--	100
ECC603	Image Processing and Machine Vision	20	20	20	80	3	--	--	100
ECC604	Artificial Neural Network and Fuzzy Logic	20	20	20	80	3	--	--	100
ECCDLO 601X	Department Level Optional Course-2	20	20	20	80	3	--	--	100
ECL601	Electromagnetics and Antenna Lab	--	--	--	--	--	25	25	50
ECL602	Computer Communication Networks Lab	--	--	--	--	--	25	25	50
ECL603	Image Processing and Machine Vision Lab	--	--	--	--	--	25	25	50
ECL604	Skill Lab: Linux and Networking and Server Configuration	--	--	--	--	--	25	25	50
ECM601	Mini Project 2B- FPGA based Project	--	--	--	--	--	25	25	50
Total		--	--	100	400	--	125	125	750

Department Level Optional Course-2

Course Code	Department Level Optional Course-2
ECCDLO6011	Mixed Signal VLSI
ECCDLO6012	Computer Organization and Architecture
ECCDLO6013	Digital Forensic
ECCDLO6014	Database Management System
ECCDLO6015	IoT and Industry 4.0
ECCDLO6016	Radar Engineering

UNIVERSITY OF MUMBAI



Bachelor of Engineering

in

Electronics and Telecommunication Engineering

Second Year with Effect from AY 2020-21

Third Year with Effect from AY 2021-22

Final Year with Effect from AY 2022-23

(REV- 2019 'C' Scheme) from Academic Year 2019 – 20

Under

FACULTY OF SCIENCE & TECHNOLOGY

(As per AICTE guidelines with effect from the academic year
2019–2020)

Program Structure for Third Year Engineering

Semester V & VI

UNIVERSITY OF MUMBAI

(With Effect from 2021-2022)

Semester V

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total
ECC501	Digital Communication	3	--	--	3	--	--	3
ECC502	Discrete Time Signal Processing	3	--	--	3	--	--	3
ECC503	Digital VLSI	3	--	--	3	--	--	3
ECC504	Random Signal Analysis	3	--	1	3	--	1	4
ECCDLO 501X	Department Optional Course-1	3	--	--	3	--	--	3
ECL501	Digital Communication Lab	--	2	--	--	1	--	1
ECL502	Discrete Time Signal Processing Lab	--	2	--	--	1	--	1
ECL503	Digital VLSI Lab	--	2	--	--	1	--	1
ECL504	Professional Communication & Ethics - II	--	2*+2~	--	--	2	--	2
ECM501	Mini Project 2A- Embedded System Project	--	4 ^{\$}	--	--	2	--	2
Total		15	14	1	15	07	1	23

* Theory should be conducted for the full class.

~ Batch-wise practical's to be conducted

\$ Indicates work load of a learner (Not Faculty) for Mini Project 2A. Faculty Load: 1 hour per week per four groups.

Course Code	Course Name	Examination Scheme							Total
		Theory					Term Work	Pract. & oral	
		Internal Assessment			End Sem. Exam	Exam. Duration (in Hrs)			
		Test 1	Test 2	Avg.					
ECC501	Digital Communication	20	20	20	80	3	--	--	100
ECC502	Discrete Time Signal Processing	20	20	20	80	3	--	--	100
ECC503	Digital VLSI	20	20	20	80	3	--	--	100
ECC504	Random Signal Analysis	20	20	20	80	3	25	--	125
ECCDLO 501X	Department Level Optional Course-1	20	20	20	80	3	--	--	100
ECL501	Digital Communication Lab	--	--	--	--	--	25	25	50
ECL502	Discrete Time Signal Processing Lab	--	--	--	--	--	25	25	50
ECL503	Digital VLSI Lab	--	--	--	--	--	25	25	50
ECL504	Business Communication and Ethics Lab	--	--	--	--	--	25	25	50
ECM501	Mini Project 2A- Embedded System Project	--	--	--	--	--	25	25	50
Total		--	--	100	400	--	150	125	775

Department Level Optional Course-1

Course Code	Department Level Optional Course-1
ECCDLO5011	Digital and IPTV Engineering
ECCDLO5012	Data Compression and Cryptography
ECCDLO5013	IT Infra and Security
ECCDLO5014	Data Structures and Algorithm
ECCDLO5015	Sensor Technology

UNIVERSITY OF MUMBAI



Bachelor of Engineering

First Year Engineering (Semester I & II), Revised course
(REV- 2019 'C' Scheme) from Academic Year 2019 – 20
(Common for All Branches of Engineering)

Under

FACULTY OF SCIENCE & TECHNOLOGY

(As per AICTE guidelines with effect from the academic year
2019–2020)

Program Structure for First Year Engineering
Semester I & II
UNIVERSITY OF MUMBAI
(With Effect from 2019-2020)

Semester I

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned				
		Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total	
FEC101	Engineering Mathematics-I	3	--	1*	3	--	1	4	
FEC102	Engineering Physics-I	2		--	2		--	2	
FEC103	Engineering Chemistry-I	2	--	--	2	--	--	2	
FEC104	Engineering Mechanics	3	--	--	3	--	--	3	
FEC105	Basic Electrical Engineering	3	--	--	3	--	--	3	
FEL101	Engineering Physics-I	--	1	--	--	0.5	--	0.5	
FEL102	Engineering Chemistry-I	--	1	--	--	0.5	--	0.5	
FEL103	Engineering Mechanics	--	2	--	--	1	--	1	
FEL104	Basic Electrical Engineering	--	2	--	--	1	--	1	
FEL105	Basic Workshop practice-I	--	2	--	--	1	--	1	
Total		13	08	01	13	04	01	18	
Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract. /oral	Total
		Internal Assessment			End Sem. Exam.	Exam. Duration (in Hrs)			
		Test1	Test 2	Avg.					
FEC101	Engineering Mathematics-I	20	20	20	80	3	25	--	125
FEC102	Engineering Physics-I	15	15	15	60	2	--	--	75
FEC103	Engineering Chemistry-I	15	15	15	60	2	--	--	75
FEC104	Engineering Mechanics	20	20	20	80	3	--	--	100
FEC105	Basic Electrical Engineering	20	20	20	80	3	--	--	100
FEL101	Engineering Physics-I	--	--	--	--	--	25	--	25
FEL102	Engineering Chemistry-I	--	--	--	--	--	25	--	25
FEL103	Engineering Mechanics	--	--	--	--	--	25	25	50
FEL104	Basic Electrical Engineering	--	--	--	--	--	25	25	50
FEL105	Basic Workshop practice-I	--	--	--	--	--	50	--	50
Total		--	--	90	360	--	175	50	675

* May be conducted batch-wise

Semester II

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned				
		Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total	
FEC201	Engineering Mathematics-II	3	--	1*	3	--	1	4	
FEC202	Engineering Physics-II	2	--	--	2	--	--	2	
FEC203	Engineering Chemistry-II	2	--	--	2	--	--	2	
FEC204	Engineering Graphics	2	--	--	2	--	--	2	
FEC205	C programming	2	--	--	2	--	--	2	
FEC206	Professional Communication and Ethics- I	2	--	--	2	--	--	2	
FEL201	Engineering Physics-II	--	1	--	--	0.5	--	0.5	
FEL202	Engineering Chemistry-II	--	1	--	--	0.5	--	0.5	
FEL203	Engineering Graphics	--	4	--	--	2	--	2	
FEL204	C programming	--	2	--	--	1	--	1	
FEL205	Professional Communication and Ethics- I	--	2	--	--	1	--	1	
FEL206	Basic Workshop practice-II	--	2	--	--	1	--	1	
Total		13	12	01	13	06	01	20	
Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract. /oral	Total
		Internal Assessment			End Sem. Exam.	Exam. Duration (in Hrs)			
		Test1	Test 2	Avg.					
FEC201	Engineering Mathematics-II	20	20	20	80	3	25	--	125
FEC202	Engineering Physics-II	15	15	15	60	2	--	--	75
FEC203	Engineering Chemistry-II	15	15	15	60	2	--	--	75
FEC204	Engineering Graphics	15	15	15	60	3	--	--	75
FEC205	C programming	15	15	15	60	2	--	--	75
FEC206	Professional Communication and Ethics- I	10	10	10	40	2	--	--	50
FEL201	Engineering Physics-II	--	--	--	--	--	25	--	25
FEL202	Engineering Chemistry-II	--	--	--	--	--	25	--	25
FEL203	Engineering Graphics	--	--	--	--	--	25	50	75
FEL204	C programming	--	--	--	--	--	25	25	50
FEL205	Professional Communication and Ethics- I	--	--	--	--	--	25	--	25
FEL206	Basic Workshop practice-II	--	--	--	--	--	50	--	50
Total		--	--	90	360	--	200	75	725

* May be conducted batch-wise

AC: 23/7/2020

Item No. : 126

UNIVERSITY OF MUMBAI



Bachelor of Engineering

in

Information Technology Engineering

Second Year with Effect from AY 2020-21

Third Year with Effect from AY 2021-22

Final Year with Effect from AY 2022-23

(REV- 2019 'C' Scheme) from Academic Year 2019 – 20

Under

FACULTY OF SCIENCE & TECHNOLOGY

(As per AICTE guidelines with effect from the academic year
2019–2020)

**Program Structure for Second Year
Engineering Semester III & IV
UNIVERSITY OF MUMBAI
(With Effect from 2020-2021)**

Semester III

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned				
		Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total	
ITC301	Engineering Mathematics-III	3	--	1	3	--	1	4	
ITC302	Data Structure and Analysis	3		--	3		--	3	
ITC303	Database Management System	3	--	--	3	--	--	3	
ITC304	Principle of Communication	3	--	--	3	--	--	3	
ITC305	Paradigms and Computer Programming Fundamentals	3	--	--	3	--	--	3	
ITL301	Data Structure Lab	--	2	--	--	1	--	1	
ITL302	SQL Lab	--	2	--	--	1	--	1	
ITL303	Computer programming Paradigms Lab	--	2	--	--	1	--	1	
ITL304	Java Lab (SBL)	--	4	--	--	2	--	2	
ITM301	Mini Project – 1 A for Front end /backend Application using JAVA	--	4 ^s	--	--	2	--	2	
Total		15	14	1	15	07	1	23	
Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract/oral	Total
		Internal Assessment			End Sem. Exam	Exam. Duration (in Hrs)			
		Test 1	Test2	Avg.					
ITC301	Engineering Mathematics-III	20	20	20	80	3	25	--	125
ITC302	Data Structure and Analysis	20	20	20	80	3	--	--	100
ITC303	Database Management System	20	20	20	80	3	--	--	100
ITC304	Principle of Communication	20	20	20	80	3	--	--	100
ITC305	Paradigms and Computer Programming Fundamentals	20	20	20	80	3	--	--	100
ITL301	Data Structure Lab	--	--	--	--	--	25	25	50
ITL302	SQL Lab	--	--	--	--	--	25	25	50
ITL303	Computer programming Paradigms Lab	--	--	--	--	--	25	25	50
ITL304	Java Lab (SBL)	--	--	--	--	--	25	25	50
ITM301	Mini Project – 1 A for Front end /backend Application using JAVA	--	--	--	--	--	25	25	50
Total		--	--	100	400	--	150	125	775

\$ indicates work load of Learner (Not Faculty), for Mini-Project. Students can form groups with minimum 2 (Two) and not more than 4 (Four) Faculty Load : 1 hour per week per four groups.

**Program Structure for Second Year
Engineering Semester III & IV
UNIVERSITY OF MUMBAI
(With Effect from 2020-2021)**

Semester IV

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned				
		Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total	
ITC401	Engineering Mathematics-IV	3	--	1	3	--	1	4	
ITC402	Computer Network and Network Design	3	--	--	3	--	--	3	
ITC403	Operating System	3	--	--	3	--	--	3	
ITC404	Automata Theory	3	--	--	3	--	--	3	
ITC405	Computer Organization and Architecture	3	--	--	3	--	--	3	
ITL401	Network Lab	--	2	--	--	1	--	1	
ITL402	Unix Lab	--	2	--	--	1	--	1	
ITL403	Microprocessor Lab	--	2	--	--	1	--	1	
ITL404	Python Lab (SBL)	--	4	--	--	2	--	2	
ITM401	Mini Project – 1 B for Python based automation projects	--	4 ^{\$}	--	--	2	--	2	
Total		15	14	1	15	7	1	23	
Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract/oral	Total
		Internal Assessment			End Sem. Exam.	Exam. Duration (in Hrs)			
		Test 1	Test 2	Avg.					
ITC401	Engineering Mathematics-IV	20	20	20	80	3	25	--	125
ITC402	Computer Network and Network Design	20	20	20	80	3	--	--	100
ITC403	Operating System	20	20	20	80	3	--	--	100
ITC404	Automata Theory	20	20	20	80	3	--	--	100
ITC405	Computer Organization and Architecture	20	20	20	80	3	--	--	100
ITL401	Network Lab	--	--	--	--	--	25	25	50
ITL402	Unix Lab	--	--	--	--	--	25	25	50
ITL403	Microprocessor Lab	--	--	--	--	--	25	25	50
ITL404	Python Lab (SBL)	--	--	--	--	--	25	25	50
ITM401	Mini Project – 1 B for Python based automation projects	--	--	--	--	--	25	25	50
Total		--	--	100	400	--	150	75	775

\$ indicates work load of Learner (Not Faculty), for Mini Project. Students can form groups with minimum 2 (Two) and not more than 4 (Four) Faculty Load : 1 hour per week per four groups

AC: 29/6/2021

Item No. : 6.12

UNIVERSITY OF MUMBAI



Bachelor of Engineering

in

Information Technology

Third Year with Effect from AY 2021-22

(REV- 2019 'C' Scheme) from Academic Year 2019 – 20

Under

FACULTY OF SCIENCE & TECHNOLOGY

(As per AICTE guidelines with effect from the academic year
2019–2020)

Program Structure for Third Year Information Technology

Semester V & VI

UNIVERSITY OF MUMBAI

(With Effect from 2021-2022)

Semester V

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned				
		Theory	Pract.	Theory	Pract.	Total			
ITC501	Internet Programming	3	--	3	--	3			
ITC502	Computer Network Security	3	--	3	--	3			
ITC503	Entrepreneurship and E-business	3	--	3	--	3			
ITC504	Software Engineering	3	--	3	--	3			
ITDO501X	Department Optional Course – 1	3	--	3	--	3			
ITL501	IP Lab	-	2	--	1	1			
ITL502	Security Lab	-	2	--	1	1			
ITL503	DevOPs Lab	-	2	--	1	1			
ITL504	Advance DevOPs Lab	-	2	--	1	1			
ITL505	Professional Communication & Ethics-II (PCE-II)	-	2*+2	--	2	2			
ITM501	Mini Project – 2 A Web Based Business Model	-	4 ^s	--	2	2			
Total		15	16	15	08	23			
Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Prac /oral	Total
		Internal Assessment			End Sem Exam	Exam. Duration (in Hrs)			
		Test1	Test2	Avg					
ITC501	Internet Programming	20	20	20	80	3	--	--	100
ITC502	Computer Network Security	20	20	20	80	3	--	--	100
ITC503	Entrepreneurship and E-business	20	20	20	80	3	--	--	100
ITC504	Software Engineering	20	20	20	80	3	--	--	100
ITDO501X	Department Optional Course – 1	20	20	20	80	3	--	--	100
ITL501	IP Lab	--	--	--	--	--	25	25	50
ITL502	Security Lab	--	--	--	--	--	25	25	50
ITL503	DevOPs Lab	--	--	--	--	--	25	25	50

ITL504	Advance DevOPs Lab	--	--	--	--	--	25	25	50
ITL505	Professional Communication & Ethics-II (PCE-II)	--	--	--	--	--	50	--	50
ITM501	Mini Project – 2 A Web Based Business Model	--	--	--	--	--	25	25	50
Total		--	--	100	400	--	175	125	800

* Theory class to be conducted for full class

\$ indicates work load of Learner (Not Faculty), for Mini-Project. Students can form groups with minimum 2(Two) and not more than 4(Four). Faculty Load: 1hour per week per four groups.

ITDO501X	Department Optional Course – 1
ITDO5011	Microcontroller Embedded Programming
ITDO5012	Advance Data Management Technologies
ITDO5013	Computer Graphics & Multimedia System
ITDO5014	Advanced Data structure and Analysis

Program Structure for Third Year Information Technology

Semester V & VI

UNIVERSITY OF MUMBAI

(With Effect from 2021-2022)

Semester VI

Course Code	Course Name	Teaching Scheme (Contact Hours)		Credits Assigned					
		Theory	Pract. Tut.	Theory	Pract.	Total			
ITC601	Data Mining & Business Intelligence	3	--	3	--	3			
ITC602	Web X.0	3	--	3	--	3			
ITC603	Wireless Technology	3	--	3	--	3			
ITC604	AI and DS – 1	3	--	3	--	3			
ITDO601 X	Department Optional Course – 2	3	--	3	--	3			
ITL601	BI Lab	--	2	--	1	1			
ITL602	Web Lab	--	2	--	1	1			
ITL603	Sensor Lab	--	2	--	1	1			
ITL604	MAD & PWA Lab	--	2	--	1	1			
ITL605	DS using Python Skill based Lab	--	2	--	1	1			
ITM601	Mini Project – 2 B Based on ML	--	4 ^{\$}	--	2	2			
Total		15	14	15	07	22			
Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Prac /oral	Total
		Internal Assessment			End Sem Exam	Exam. Duration (in Hrs)			
		Test1	Test2	Avg					
ITC601	Data Mining & Business Intelligence	20	20	20	80	3	--	--	100
ITC602	Web X.0	20	20	20	80	3	--	--	100
ITC603	Wireless Technology	20	20	20	80	3	--	--	100
ITC604	AI and DS – 1	20	20	20	80	3	--	--	100
ITDO601 X	Department Optional Course – 2	20	20	20	80	3	--	--	100
ITL601	BI Lab	--	--	--	--	--	25	25	50
ITL602	Web Lab	--	--	--	--	--	25	25	50
ITL603	Sensor Lab	--	--	--	--	--	25	25	50
ITL604	MAD & PWA Lab	--	--	--	--	--	25	25	50
ITL605	DS using Python Lab (SBL)	--	--	--	--	--	25	25	50

ITM601	Mini Project – 2 B Based on ML	--	--	--	--	--	25	25	50
Total		--	--	100	400	--	150	150	800

\$ indicates work load of Learner (Not Faculty), for Mini-Project. Students can form groups with minimum 2(Two) and not more than 4(Four). Faculty Load: 1hour per week per four groups.

ITDO601X	Department Optional Course – 2
ITDO6011	Software Architecture
ITDO6012	Image Processing
ITDO6013	Green IT
ITDO6014	Ethical Hacking and Forensic