



Symbiosis Institute of Technology, Pune
Bachelor of Technology (Computer Science and Engineering)
Programme Structure 2019-23

1. OBJECTIVE	<p>B.Tech is a full-time four year graduation programme, which aims at transforming a student into a technically sound professional. The syllabus contains courses on basic sciences, technical arts, humanities & liberal arts and professional courses. The mix of these courses has been evolved with an aim to produce professionals who have knowledge not only of Engineering but who are good managers to contribute in a cross-functional team and have human values. Being a professional programme it ensures a healthy balance between theoretical foundation and practical exposure to the present day world. The emphasis is to develop all round personality that would enable the students to take up the challenges of the corporate world and also become responsible citizens of the society.</p>			
2. DURATION (IN MONTHS)	48 (Full Time)			
3. INTAKE	180			
4. RESERVATION	I. Within the sanctioned intake	a) SC (In Percentage)	b) ST (In Percentage)	c) Differently abled (In Percentage)
		15	7.5	3
	II. Over and above the sanctioned intake	a) Kashmiri Migrants (In Seats)		b) International Students (In Percentage)
		2		15
5. ELIGIBILITY	<p>Passed 10+2 examination with Physics and Mathematics as compulsory subjects along with one of Chemistry/ Biotechnology/ Biology/ Technical Vocational subjects. Obtained at least 45% marks or equivalent grade (40% marks or equivalent grade for Scheduled Caste /Scheduled Tribes) in the above subjects taken together.</p> <p>B. Tech (Lateral entry to second year) :</p> <p>a) Passed Diploma examination from an AICTE approved Institution; with at least 45% marks or equivalent grade (40% marks or equivalent grade for Scheduled Caste /Scheduled Tribes) in appropriate branch of Engineering / Technology.</p> <p>b) Passed B.Sc. Degree from a recognized University as defined by UGC, with at least 45% marks or equivalent grade (40% marks or equivalent grade for Scheduled Caste /Scheduled Tribes) and passed XII standard with mathematics as a subject.</p> <p>c) Provided that in case of students belonging to B. Sc. Stream, shall clear the subjects of Engineering Graphics / Engineering Drawing and Engineering Mechanics of the first year Engineering program along with the second year subjects.</p> <p>d) Provided further that, the students belonging to B. Sc. Stream shall be considered only after filling the supernumerary seats in this category with students belonging to the Diploma stream.</p> <p>e) Provided further that students, who have passed Diploma in Engineering and Technology from an AICTE approved Institution or B. Sc. Degree from a recognized University as defined by UGC, shall also be eligible for admission to</p>			



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		the first year Engineering Degree courses subject to vacancies in the first year class in case the vacancies at lateral entry are exhausted. However the admissions shall be based strictly on the eligibility criteria as mentioned in a, b, c, and d above.			
6.	SELECTION PROCEDURE	Merit list by valid score of Symbiosis Entrance Test (SET) or Joint Entrance Examination (JEE - Main) or Maharashtra Common Entrance Test (MHT-CET)			
7.	MEDIUM OF INSTRUCTION	English			
8.	PROGRAMME PATTERN	Semester			
9.	COURSE & SPECIALIZATION	As per Annexure A Students can pursue additional specialization in the following areas by completing 20 credits specified in the program structure of that specialization beyond the minimum requirement for the award of degree. AI and Machine learning, Data Science, Computing, Game Design & Development, Security and Privacy, Internet of Things			
10.	FEE		Academic Fee p.a	Institute Deposit	Total
		Indian Students	260000	20000	280000
		International Students (USD equivalent to INR)	390000	20000	410000
11.	ASSESSMENT	All internal courses will have 100% component as internal evaluation at the institute level. All external courses will have 40% internal component and 60% component as external [University] examination. The internal and external will be separate heads of passing.			
12.	STANDARD OF PASSING	The assessment of the student for each examination is done, based on relative performance. Maximum Grade Point (GP) is 10 corresponding to O (Outstanding). For all courses, a student is required to pass both internal and external examination separately with a minimum Grade Point of 4 corresponding to Grade P. Students securing less than 40% absolute marks in each head of passing will be declared FAIL. The University awards a degree to the student who has achieved a minimum CGPA of 4 out of maximum of 10 CGPA for the programme.			
13.	AWARD OF DEGREE/ DIPLOMA/ CERTIFICATE	Bachelor of Technology (Computer Science & Engineering) will be awarded at the end of semester VIII examination by taking into consideration the performance of all semester examinations after obtaining minimum 4.00 CGPA out of 10 CGPA.			

14. NATURE WISE DISTRIBUTION OF CREDITS							
Semester	Generic Core	Generic Elective	Specialization Core	Specialization Elective	Open Elective	Audit	Total
Group A							
1	0	20	0	0	0	0	20
2	0	19	0	0	0	0	19
3	23	1	0	0	0	0	24
4	17	2	0	0	0	1*	19
5	22	3	0	0	0	0	25
6	14	11	0	0	0	0	25
7	11	13	0	0	0	0	24
8	14	0	0	0	0	0	14
Total	101	69	0	0	0	0	170
Group B							
1	0	19	0	0	0	0	19
2	0	20	0	0	0	0	20
3	23	1	0	0	0	0	24
4	17	2	0	0	0	0	19
5	22	3	0	0	0	0	25
6	14	11	0	0	0	0	25
7	11	13	0	0	0	0	24
8	14	0	0	0	0	0	14
Total	101	69	0	0	0	0	170
Optional Additional Courses							
Total	0	0	20	0	0	0	20
Grand Total							190

* Satisfactory completion of the non letter grade course 'Integrated Disaster Management' is mandatory for award of degree.

Note: For additional specializations (optional) as applicable, fees of Rs.25000/- will be charged, additionally in the third year

The revised programme structure supersedes the previously approved programme structure dated 27/06/2019 for the programme.

Programme Structure is approved by the Academic Council subject to its norms & conditions. Any provision in the Programme Structure which violates the basic rules & regulations is deemed to be termed "Null & Void".

Head-Academics

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Celebrating 50 Years of Excellence

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Annexure A

Catalog Course Code	Course Code	Course Title	Specialization	Credits	Internal Marks	External Mark	Internal Practical Marks	External Practical Marks	Total Marks
Semester : 1									
Group - A									
Generic Elective Courses Group									
TE7168	070122101	Engineering Mathematics -I		4	40	60	0	0	100
T7391	070122102	Physics		3	30	45	0	0	75
TE7288	070122103	Programming in C		3	30	45	0	0	75
TE7188	070122104	Environmental Science		2	20	30	0	0	50
TE7300	070122105	Tinker Lab		2	0	0	50	0	50
T7383	070122106	Communication Skills		2	20	30	0	0	50
T7384	070122107	Communication skills lab		1	0	0	10	15	25
T6773	070122108	Creative Thinking		1	25	0	0	0	25
T7392	070122109	Physics lab		1	0	0	10	15	25
TE7289	070122110	Programming in C Lab		1	0	0	10	15	25
Total Required Credits				20	165	210	80	45	500
Group - B									
Generic Elective Courses Group									
TE7168	070122101	Engineering Mathematics -I		4	40	60	0	0	100
T7381	070122111	Chemistry		3	30	45	0	0	75
T7540	070122112	Basic Electrical and Electronics Engineering		3	30	45	0	0	75
TE7286	070122113	Programming and Problem Solving		2	20	30	0	0	50
T7924	070122114	Engineering Graphics		2	0	0	20	30	50
TE7396	070122115	Software Tools		1	25	0	0	0	25
TE7287	070122116	Programming and Problem Solving Lab		1	0	0	10	15	25
T6732	070122117	Critical Thinking		1	25	0	0	0	25
T7593	070122118	Basic Electrical and Electronics Engineering Lab		1	0	0	10	15	25
T7382	070122119	Chemistry Lab		1	0	0	10	15	25
Total Required Credits				19	170	180	50	75	475
Semester : 2									
Group - A									
Generic Elective Courses Group									
TE7169	070122201	Engineering Mathematics -II		4	40	60	0	0	100
T7381	070122202	Chemistry		3	30	45	0	0	75
T7540	070122203	Basic Electrical and Electronics Engineering		3	30	45	0	0	75
T7924	070122204	Engineering Graphics		2	0	0	20	30	50
TE7286	070122205	Programming and Problem Solving		2	20	30	0	0	50



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TE7287	070122206	Programming and Problem Solving Lab		1	0	0	10	15	25
T6732	070122207	Critical Thinking		1	25	0	0	0	25
TE7396	070122208	Software Tools		1	25	0	0	0	25
T7593	070122209	Basic Electrical and Electronics Engineering Lab		1	0	0	10	15	25
T7382	070122210	Chemistry Lab		1	0	0	10	15	25
Total Required Credits				19	170	180	50	75	475
Group - B									
Generic Elective Courses Group									
TE7169	070122201	Engineering Mathematics -II		4	40	60	0	0	100
T7391	070122211	Physics		3	30	45	0	0	75
TE7288	070122212	Programming in C		3	30	45	0	0	75
TE7300	070122213	Tinker Lab		2	0	0	50	0	50
T7383	070122214	Communication Skills		2	20	30	0	0	50
TE7188	070122215	Environmental Science		2	20	30	0	0	50
T6773	070122216	Creative Thinking		1	25	0	0	0	25
T7384	070122217	Communication skills lab		1	0	0	10	15	25
TE7289	070122218	Programming in C Lab		1	0	0	10	15	25
T7392	070122219	Physics lab		1	0	0	10	15	25
Total Required Credits				20	165	210	80	45	500
Semester : 3									
Generic Core Courses									
T7995	070122301	Discrete Mathematics and Probability Theory		4	40	60	0	0	100
T7906	070122302	Fundamentals of Data Structures		3	30	45	0	0	75
T7512	070122303	Programming Paradigms		3	30	45	0	0	75
T7996	070122304	Computer Organization		3	30	45	0	0	75
T7997	070122305	Digital Electronics and Logic Design		3	30	45	0	0	75
F7010	070122306	Agile Software Development		3	75	0	0	0	75
T7555	070122307	Digital Electronics and Logic Design Lab		1	0	0	10	15	25
T2646	070122308	Entrepreneurship Venture		1	25	0	0	0	25
T7513	070122309	Programming Paradigms Lab		1	0	0	10	15	25
TE7257	070122310	Fundamentals of Data Structures Lab		1	0	0	10	15	25
Total				23	260	240	30	45	575



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Generic Elective Courses Group									
T6760	070122311	Introduction to Indian Philosophy		1	25	0	0	0	25
T6761	070122312	Foundation of Ethics		1	25	0	0	0	25
Total Required Credits				1	25	0	0	0	25
Semester : 4									
Generic Core Courses									
F0004	070122401	Flexi-Credit Course		4	100	0	0	0	100
T7488	070122402	Data Structures		3	30	45	0	0	75
T7510	070122403	Operating Systems		3	30	45	0	0	75
TE7170	070122404	Engineering Mathematics-III		3	30	45	0	0	75
TE7290	070122405	Project Based Learning -I		2	0	0	20	30	50
T7489	070122406	Data Structures Lab		1	0	0	10	15	25
T7511	070122407	Operating Systems Lab		1	0	0	10	15	25
T4005	070122408	Integrated Disaster Management *		0	0	0	0	0	Non Letter Grade
Total				17	190	135	40	60	425
Generic Elective Courses Group									
T6012	070122409	Basic German I		2	50	0	0	0	50
T6014	070122410	Basic French I		2	50	0	0	0	50
T6016	070122411	Basic Spanish I		2	50	0	0	0	50
Total Required Credits				2	50	0	0	0	50
Semester : 5									
Generic Core Courses									
T8000	070122501	Service Learning		4	100	0	0	0	100
F0004	070122502	Flexi-Credit Course		4	100	0	0	0	100
T7908	070122503	Computer Networks		3	30	45	0	0	75
T7907	070122504	Database Management Systems		3	30	45	0	0	75
TE7299	070122505	Theory of Computation		3	30	45	0	0	75
T7487	070122506	Data Base Management Systems Lab		2	0	0	20	30	50
T6774	070122507	Principles of Economics		2	50	0	0	0	50
T7482	070122508	Computer Networks Lab		1	0	0	10	15	25
Total				22	340	135	30	45	550
Specialization Core Courses for Optional Additional Specialization : AI and Machine Learning (Major)									
TE7273	070122509	Machine Learning: Classification	AI and Machine Learning	3	30	45	0	0	75



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TE7274	070122510	Machine Learning: Regression	AI and Machine Learning	3	30	45	0	0	75
Total				6	60	90	0	0	150
Specialization Core Courses for Optional Additional Specialization : Computing (Major)									
T7476	070122511	Cloud Computing	Computing	3	30	45	0	0	75
TE7250	070122512	Cloud Environment in Public Model	Computing	3	30	45	0	0	75
Total				6	60	90	0	0	150
Specialization Core Courses for Optional Additional Specialization : Data Science (Major)									
TE7281	070122513	Open Source Tools for Data Science	Data Science	4	40	60	0	0	100
TE7292	070122514	R Programming	Data Science	3	30	45	0	0	75
Total				7	70	105	0	0	175
Specialization Core Courses for Optional Additional Specialization : Game Design & Development (Major)									
TE7267	070122515	Introduction to Game Development	Game Design & Development	3	30	45	0	0	75
TE7285	070122516	Principles of Game Design	Game Design & Development	3	30	45	0	0	75
Total				6	60	90	0	0	150
Specialization Core Courses for Optional Additional Specialization : Internet of Things (Major)									
TE7268	070122517	Introduction to IOT	Internet of Things	4	40	60	0	0	100
TE7293	070122518	Raspberry Pi and Python	Internet of Things	3	30	45	0	0	75
Total				7	70	105	0	0	175
Specialization Core Courses for Optional Additional Specialization : Security and Privacy (Major)									
TE7296	070122519	Software Security	Security and Privacy	3	30	45	0	0	75
TE7301	070122520	Usable Security	Security and Privacy	3	30	45	0	0	75
Total				6	60	90	0	0	150
Generic Elective Courses Group									
T7393	070122521	Computer Based Statistical Packages		3	30	45	0	0	75
T7499	070122522	Java		3	30	45	0	0	75
T7574	070122523	MATLAB		3	30	45	0	0	75
T7020	070122524	Nanotechnology		3	30	45	0	0	75
T2618	070122525	Project Management		3	30	45	0	0	75
TE7223	070122526	Smart Urban Planning		3	30	45	0	0	75
TE7240	070122527	Water Resource Planning and Management		3	30	45	0	0	75



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TE7263	070122528	Introduction to AI and Machine Learning		3	30	45	0	0	75
TE7265	070122529	Introduction to Data Science		3	30	45	0	0	75
TE7332	070122530	Introduction to Image Processing		3	30	45	0	0	75
TE7335	070122531	Introduction to Robotics		3	30	45	0	0	75
TE7339	070122532	Renewable Energy Systems		3	30	45	0	0	75
TE7351	070122533	3D Printing and Prototyping		3	30	45	0	0	75
TE7365	070122534	Electrical and Electronics Materials		3	30	45	0	0	75
TE7388	070122535	Quality Management Techniques		3	30	45	0	0	75
Total Required Credits				3	30	45	0	0	75
Semester : 6									
Generic Core Courses									
TE7008	070122601	Distributed Systems and Resource Management		3	30	45	0	0	75
F0003	070122602	Flexi-Credit Course		3	75	0	0	0	75
T2658	070122603	Design Thinking		2	50	0	0	0	50
T7674	070122604	Cyber Security		2	50	0	0	0	50
TE7291	070122605	Project Based Learning-II		2	0	0	20	30	50
T7802	070122606	Capstone Course		2	0	0	20	30	50
Total				14	205	45	40	60	350
Specialization Core Courses for Optional Additional Specialization : AI and Machine Learning (Major)									
TE7266	070122607	Introduction to Deep Learning	AI and Machine Learning	4	40	60	0	0	100
TE7271	070122608	Machine Learning Clustering and Retrieval	AI and Machine Learning	3	30	45	0	0	75
Total				7	70	105	0	0	175
Specialization Core Courses for Optional Additional Specialization : Computing (Major)									
TE7246	070122609	Block Chain	Computing	4	40	60	0	0	100
TE7249	070122610	Cloud Computing Platforms	Computing	3	30	45	0	0	75
Total				7	70	105	0	0	175
Specialization Core Courses for Optional Additional Specialization : Data Science (Major)									
T2228	070122611	Business Analytics	Data Science	3	30	45	0	0	75
TE7284	070122612	Power BI	Data Science	3	30	45	0	0	75
Total				6	60	90	0	0	150
Specialization Core Courses for Optional Additional Specialization : Game Design & Development (Major)									
TE7275	070122613	Modern Platforms in Game Development	Game Design & Development	4	40	60	0	0	100



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TE7256	070122614	Entrepreneurship in Game Development	Game Design & Development	3	30	45	0	0	75
Total				7	70	105	0	0	175
Specialization Core Courses for Optional Additional Specialization : Internet of Things (Major)									
TE7269	070122615	IOT Security and Privacy	Internet of Things	3	30	45	0	0	75
TE7295	070122616	Software Defined Networking	Internet of Things	3	30	45	0	0	75
Total				6	60	90	0	0	150
Specialization Core Courses for Optional Additional Specialization : Security and Privacy (Major)									
TE7252	070122617	Cryptography	Security and Privacy	4	40	60	0	0	100
TE7258	070122618	Hardware Security	Security and Privacy	3	30	45	0	0	75
Total				7	70	105	0	0	175
Generic Elective Courses Group									
TE7255	070122619	Data Warehousing and Mining		3	30	45	0	0	75
TE7101	070122620	Internet of Things		3	30	45	0	0	75
TE7328	070122621	Image Processing		3	30	45	0	0	75
Total Required Credits				3	30	45	0	0	75
Generic Elective Courses Group									
TE7013	070122622	Data Warehousing and Mining Lab		1	0	0	10	15	25
T7528	070122623	Internet of Things Lab		1	0	0	10	15	25
TE7329	070122624	Image Processing Lab		1	0	0	10	15	25
Total Required Credits				1	0	0	10	15	25
Generic Elective Courses Group									
T7473	070122625	Artificial Intelligence		3	30	45	0	0	75
TE7259	070122626	Human Computer Interface		3	30	45	0	0	75
TE7243	070122627	Advanced Algorithms		3	30	45	0	0	75
Total Required Credits				3	30	45	0	0	75
Generic Elective Courses Group									
TE7014	070122628	Artificial Intelligence Lab		1	0	0	10	15	25
TE7260	070122629	Human Computer Interface Lab		1	0	0	10	15	25
TE7244	070122630	Advanced Algorithms Lab		1	0	0	10	15	25
Total Required Credits				1	0	0	10	15	25



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Generic Elective Courses Group									
T7474	070122631	Basics of Database		3	30	45	0	0	75
T7616	070122632	Fundamentals of Automotive Technology		3	30	45	0	0	75
T7529	070122633	Machine Learning		3	30	45	0	0	75
T7509	070122634	Open Source Technologies		3	30	45	0	0	75
T7584	070122635	Printed Circuit Board (PCB) Design		3	30	45	0	0	75
T7650	070122636	Six sigma		3	30	45	0	0	75
T7394	070122637	Smart Materials		3	30	45	0	0	75
TE7195	070122638	GIS Applications		3	30	45	0	0	75
TE7264	070122639	Introduction to BIGDATA		3	30	45	0	0	75
TE7171	070122640	Introduction to Mathematical Modelling		3	30	45	0	0	75
TE7204	070122641	Intelligent Transportation Systems		3	30	45	0	0	75
TE7334	070122642	Introduction to Mechatronics		3	30	45	0	0	75
TE7338	070122643	Principles of Modern Communication Systems		3	30	45	0	0	75
TE7376	070122644	Introduction to Operations Research		3	30	45	0	0	75
TE7377	070122645	Introduction to Optimisation		3	30	45	0	0	75
Total Required Credits				3	30	45	0	0	75
Semester : 7									
Generic Core Courses									
T7804	070122701	Project		4	0	0	40	60	100
T7477	070122702	Compiler Construction		3	30	45	0	0	75
F0003	070122703	Flexi-Credit Course		3	75	0	0	0	75
T7478	070122704	Compiler Construction Lab		1	0	0	10	15	25
Total				11	105	45	50	75	275
Specialization Core Courses for Optional Additional Specialization : AI and Machine Learning (Major)									
T7805	070122705	Project	AI and Machine Learning	5	0	0	50	75	125
T7802	070122706	Seminar	AI and Machine Learning	2	0	0	20	30	50
Total				7	0	0	70	105	175
Specialization Core Courses for Optional Additional Specialization : Computing (Major)									
T7805	070122705	Project	Computing	5	0	0	50	75	125
T7802	070122706	Seminar	Computing	2	0	0	20	30	50
Total				7	0	0	70	105	175



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Specialization Core Courses for Optional Additional Specialization : Data Science (Major)									
T7805	070122705	Project	Data Science	5	0	0	50	75	125
T7802	070122706	Seminar	Data Science	2	0	0	20	30	50
Total				7	0	0	70	105	175
Specialization Core Courses for Optional Additional Specialization : Game Design & Development (Major)									
T7805	070122705	Project	Game Design & Development	5	0	0	50	75	125
T7802	070122706	Seminar	Game Design & Development	2	0	0	20	30	50
Total				7	0	0	70	105	175
Specialization Core Courses for Optional Additional Specialization : Internet of Things (Major)									
T7805	070122705	Project	Internet of Things	5	0	0	50	75	125
T7802	070122706	Seminar	Internet of Things	2	0	0	20	30	50
Total				7	0	0	70	105	175
Specialization Core Courses for Optional Additional Specialization : Security and Privacy (Major)									
T7805	070122705	Project	Security and Privacy	5	0	0	50	75	125
T7802	070122706	Seminar	Security and Privacy	2	0	0	20	30	50
Total				7	0	0	70	105	175
Generic Elective Courses Group									
T6004	070122707	Organizational Behavior		2	50	0	0	0	50
TE7438	070122708	History of Science and Technology		2	50	0	0	0	50
Total Required Credits				2	50	0	0	0	50
Generic Elective Courses Group									
TE7253	070122709	Data Science		3	30	45	0	0	75
TE7282	070122710	Optimization Techniques and Algorithms		3	30	45	0	0	75
TE7097	070122711	Neural Network		3	30	45	0	0	75
Total Required Credits				3	30	45	0	0	75
Generic Elective Courses Group									
TE7112	070122712	Neural Networks Lab		1	0	0	10	15	25
TE7283	070122713	Optimization Techniques and Algorithms Lab		1	0	0	10	15	25
TE7254	070122714	Data Science Lab		1	0	0	10	15	25
Total Required Credits				1	0	0	10	15	25



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Annexure A

Catalog Course Code	Course Code	Course Title	Specialization	Credits	Internal Marks	External Mark	Internal Practical Marks	External Practical Marks	Total Marks
Generic Elective Courses Group									
T7529	070122715	Machine Learning		3	30	45	0	0	75
T7138	070122716	Network Security		3	30	45	0	0	75
TE7103	070122717	Natural Language Processing		3	30	45	0	0	75
Total Required Credits				3	30	45	0	0	75
Generic Elective Courses Group									
TE7105	070122718	Machine Learning Lab		1	0	0	10	15	25
TE7106	070122719	Natural Language Processing Lab		1	0	0	10	15	25
T7506	070122720	Network Security Lab		1	0	0	10	15	25
Total Required Credits				1	0	0	10	15	25
Generic Elective Courses Group									
TE7251	070122721	Computer Graphics		3	30	45	0	0	75
TE7297	070122722	Software Testing Tools		3	30	45	0	0	75
T7476	070122723	Cloud Computing		3	30	45	0	0	75
Total Required Credits				3	30	45	0	0	75
Semester : 8									
Generic Core Courses									
T7912	070122801	Internship		12	0	0	180	120	300
T7802	070122803	Seminar		2	0	0	50	0	50
Total				14	0	0	230	120	350
GIP									
G7012	070122802	Global Immersion Programme		12	0	300	0	0	300

Note: For students under Global Immersion Programme (070122802), courses will be waived off.



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Semester	Internal Credits	External Credits	Total Credits	Total Marks
Group A				
Semester 1	3	17	20	500
Semester 2	2	17	19	475
Semester 3	5	19	24	600
Semester 4	6	13	19	475
Semester 5	10	15	25	625
Semester 6	7	18	25	625
Semester 7	5	19	24	600
Semester 8	2	12	14	350
Total	40	130	170	4250
Group B				
Semester 1	2	17	19	475
Semester 2	3	17	20	500
Semester 3	5	19	24	600
Semester 4	6	13	19	475
Semester 5	10	15	25	625
Semester 6	7	18	25	625
Semester 7	5	19	24	600
Semester 8	2	12	14	350
Total	40	130	170	4250