

PART IV
DETAILS OF PROGRAMMES

Legend

AAOC	Analysis and Application Oriented Courses
Bio	Biological Sciences
BIOT	Biotechnology
CDC	Compulsory Discipline Courses
CDP	Courses on Development Process
CE	Civil Engineering
Che	Chemical
Chem	Chemistry
CHI	Chinese
CS/Comp/Comp Sc	Computer Science
DCOC	Discipline Courses other than Compulsory
EA	Emerging Area
Econ	Economics
ECE	Electronics and Communication Engineering
EEE	Electrical & Electronics Engineering
EI	Electronics & Instrumentation
ES	Engineering Science
ET	Engineering Technology
Engg	Engineering: Chemical, Civil, Computer Science, Electrical & Electronics, Electronics & Instrumentation, Electronics and Communication, Manufacturing, Mechanical
ENGL	English
Exptl Sc	Experimental Science: Biological Sciences, Chemistry, Physics
Fin	Finance
FRE	French
GER	German
HSS	Humanities and Social Sciences
IS	Information Systems
ITEB	Internet Technology and e-Business
JAP	Japanese
L	Lecture hours per week
Math	Mathematics
MBA	Master of Business Administration
Mech	Mechanical
MF	Manufacturing Engineering
Min/Max	Indicates minimum/maximum number of units specified in a course or semester programme
Mgts	Management
MGSYS	Management Systems
MM	Manufacturing Management
MPH	Master in Public Health
MST	Material Science and Technology
P	Practical, Seminar & Project, etc. hours per week
PHIL	Philosophy
Pharm	Pharmacy
Phy	Physics
RUS	Russian
SS	Software Systems
Sc.	Biological Sciences, Chemistry, Economics, Mathematics, Physics
T	Suffixed to a course number indicates that a non-letter grade will be awarded in such a course
TA	Technical Arts
TOC	Technique Oriented Courses
U	Number of units associated to a course

Course descriptions are available at: www.bits-pilani.ac.in/courses/fs_coursedescriptions.html

As part of BITS Vision 2020 – Mission 2012 project, the curriculum of BITS, Pilani was benchmarked against top Universities in the world. Consequently the curriculum has undergone a strategic redesign that will be applicable for students admitted from August 2011 onwards. This part (Part IV) of the bulletin describes two different curriculum schemes – one for continuing students (pages IV-1 to IV-26) and one for new students i.e. those who are admitted August 2011 onwards (pages IV-27 onwards).

(I) STRUCTURE OF THE INTEGRATED FIRST DEGREE PROGRAMMES OF STUDENTS ADMITTED 2010 OR EARLIER

GROUP A, B AND C PROGRAMMES (More specifically B.E. (Hons.): Biotechnology, Chemical, Civil, Computer Science, Electronics & Communication, Electrical & Electronics, Electronics & Instrumentation, Manufacturing, Mechanical, B.Pharm. (Hons.) in Group A, M.Sc. (Hons.) : Biological Sciences, Chemistry, Economics, Mathematics, Physics in Group B and M.Sc. (Tech.): General Studies, Engineering Technology, Information Systems, Finance in Group C).

The structure of these programmes has sought to identify commonality amongst the various programmes as well as their divergence. Broadly the structural requirements are classified under various categories of courses as given below.

The actual requirements for these degree programmes are spelt out in terms of courses belonging to different categories. The table on page IV-8 gives these requirements in terms of minimum and maximum number of units as well as minimum and maximum number of courses of each category for Group A, B and C programmes.

The semester-wise pattern for completing the programme, is planned by a Senate appointed Committee called Academic Regulations – Clause 1.08 Committee and the current operative semester-wise patterns are given in later sections. While this has been planned in such a way that a normal student will finish the programme in 8 semesters, the completion of the programme by a student can be shorter or longer than this duration because of the flexibilities. There may be cases

where, apart from the courses listed below, certain remedial courses may be required in which case the Dean, Instruction will design these courses from time to time and report the same to the Senate. The list of courses in the various categories and other courses which are used for making these programmes are given below.

(i) Language and Literature

ENGL C261	Creative Writing	3
ENGL C262	Effective Speaking	3
ENGL C353	Effective Public Speaking	3
HINDI C201	Elementary Hindi	3 0 3
HINDI C211	Novel & Short Stories	3 0 3
HINDI C212	One Act Play & Drama	3 0 3
SANS C111	Sanskrit	3 0 3

In addition to the above, the following courses are specially designed for Group C only which cannot be taken by Group A & B students under any circumstances.

ENGL C121	English Language Skills I	3
ENGL C122	English Language Skills II	3
ENGL C123	English Language Skills	3 0 3
ENGL C221	Readings from Popular Science Writings	3 0 3
ENGL C222	Readings from Drama	3 0 3
ENGL C231	Readings from Prose and Poetry	3 0 3
ENGL C251	Linguistics	3 0 3
ENGL C252	Phonetics and Spoken English	3 0 3

(ii) Core Science

BIO C111	General Biology	3 0 3
BIO C211	Biological Chemistry	3 0 3
BIO T216	Introductory Molecular Biology	3 0 3
BIO C241	Microbiology	2 3 3
CHEM C141	Chemistry I	3 0 3
CHEM C142	Chemistry II	3 0 3
CHEM C211	Atomic and Molecular Structure	3 0 3
CHEM C222	Modern Analytical Chemistry	3 0 3

CHEM C232	Chemistry of Organic Compounds	3 0 3	TA C312	Technical Report Writing	3
PHA C211	Biological Chemistry	3 0 3	(v) Engineering Science		
PHA C212	Pharmaceutical Analysis	2 3 3	CE C212	Transport Phenomena I	3 0 3
PHA C241	Microbiology	2 3 3	CE C241	Analysis of Structures	3 0 3
PHY C131	Physics I (Mechanics, Waves & Optics)	3 0 3	CHE C213	Fluid Flow Operations	3 0 3
PHY C132	Physics II (Electricity, Magnetism & Modern Physics)	3 0 3	CHE C221	Chemical Process Calculations	3 0 3
PHY C212	Classical Mechanics	3 0 3	ECE C272	Circuits & Signals	3 0 3
PHY C221	Modern Physics	3 0 3	EEE C272	Circuits & Signals	3 0 3
In addition to the above, the following courses are specially designed for M.Sc. (Tech.) General Studies programme which can be taken by students of other programmes with prior permission from appropriate authority.			ES C112	Thermodynamics	3 0 3
BIO C111	General Biology	3 0 3	ES C221	Mechanics of Solids	3 0 3
CHEM C221	General Chemistry	3 0 3	ES C232	Transport Phenomena I	3 0 3
PHY C122	General Physics	3 0 3	ES C241	Electrical Sciences I	3 0 3
SCI C121	Social Hygiene	3 0 3	ES C242	Structure and Properties of Materials	3 0 3
SCI C212	Applied Nutrition	3 0 3	ES C263	Microprocessors Programming & Interfacing	3 2 4
SCI C311	Agricultural Science	3 0 3	ES C272	Electrical Sciences II	3 0 3
(iii) Core Mathematics			INSTR C272	Circuits & Signals	3 0 3
MATH C191	Mathematics I(Advanced Calculus)	3 0 3	ME C211	Applied Thermodynamics	3 0 3
MATH C192	Mathematics II (Complex Variables and Linear Algebra)	3 0 3	ME C212	Transport Phenomena I	3 0 3
MATH C222	Discrete Structures for Computer Science	3 0 3	MF C211	Applied Thermodynamics	3 0 3
MATH C241	Mathematics III (Differential Equations)	3 0 3	MF C212	Transport Phenomena I	3 0 3
(iv) Technical Arts			NA C211	Ocean Engineering	3 0 3
TA C111	Engineering Graphics	2 4 4	NA C212	Transport Phenomena I	3 0 3
TA C112	Workshop Practice	2 4 4	In addition to the above, the following courses are specially designed for Group C only which cannot be taken by Group A & B students under any circumstances.		
TA C162	Computer Programming I	3 0 3	ENGG C111	Electrical and Electronics Technology	3 0 3
TA C211	Measurement Techniques I	0 4 2	ENGG C212	Introduction to Systems	3 0 3
TA C222	Measurement Techniques II	1 6 4	ENGG C232	Engineering Materials	3 0 3
TA C231	Business Communication	3 0 3	ENGG C241	Mechanical Technology	3 0 3
TA C252	Computer Programming II	3	ENGG C242	Maintenance & Safety	3 0 3
			ENGG C264	Fluid and Solid Mechanics	3 0 3
			ENGG C272	Process Technology	3 0 3
			ENGG C282	Industrial Engineering Techniques	3 0 3
			ENGG C291	Electronics and Instrumentation Technology	3 0 3

ES C233	Logic in Computer Science	3 0 3	TOC C254	Computer Oriented Problem Solving II	3
ES C261	Digital Electronics and Microprocessors	3 0 3			

(vi) Analysis and Application Oriented Courses

AAOC C111	Probability and Statistics	3 0 3
AAOC C221	Graphs & Networks	3 0 3
AAOC C222	Optimisation	3 0 3
AAOC C311	Data Processing	3 0 3
AAOC C312	Operations Research	3 0 3
AAOC C321	Control Systems	3 0 3
AAOC C322	Systems	3 0 3
AAOC C341	Numerical Analysis	3 0 3
BIO C391	Instrumental Methods of Analysis	4
CHEM C391	Instrumental Methods of Analysis	4
PHA C391	Instrumental Methods of Analysis	4
PHY C391	Instrumental Methods of Analysis	4

In addition to the above, the following courses are specially designed for Group C only which cannot be taken by Groups A & B students under any circumstances.

TOC C112	Book Keeping	3 0 3
TOC C211	Book Keeping & Accountancy	3 0 3
TOC C212	Library Science	3 0 3
TOC C213	Civil Engineering Practice	3
TOC C215	Language Lab Practice	0 6 3
TOC C223	Comfort Conditioning and Refrigeration	3
TOC C224	Corporate Taxation	3 0 3
TOC C235	Electrical and Electronics Engineering Practice	0 6 3
TOC C236	Electronics and Instrumentation Engineering Practice	0 6 3
TOC C244	Production and Processing	0 6 3
TOC C253	Computer Oriented Problem Solving I	3

(vii) Humanities & Social Sciences (HSS) and Other Courses

A. HSS Courses

ECON C211	Fundamentals of Finance and Accounting	3 0 3
ECON C212	Principles of Economics	3 0 3
HIST C112	Main Trends in Indian History	3 0 3
HIST C211	Main Currents of Modern History	3 0 3
HIST C212	Middle East History	3 0 3
HIST C213	Gulf History & Culture	3 0 3
HSS C231	Economic Legislation	3 0 3
HSS C232	Indian Financial Systems	3 0 3
HSS C241	Legal Environment of Business	3 0 3
HSS C311	Taxation	3 0 3
HSS C312	Bureaucracy	3 0 3
HSS C313	Critical Analysis of Literature and Cinema	3 0 3
HSS C314	Print and Audio-Visual Advertising	3 0 3
HSS C321	Commercial Law	3 0 3
HUM C232	Indian Financial System	3 0 3
HUM C311	Journalism	3
HUM C312	Contemporary India	3 0 3
HUM C321	Appreciation of Indian Music	3 0 3
HUM C322	Commercial Art	3
HUM C331	Appreciation of Art	3 0 3
HUM C332	Cinematic Art	3
HUM C341	Comparative Indian Literature	3 0 3
HUM C342	Graphic Art	3
HUM C351	Public Administration	3 0 3
HUM C352	Painting	3
HUM C361	Accounting in Management	3 0 3
HUM C362	History of Mathematics	3 0 3
HUM C371	Linguistics	3 0 3

HUM C372	Phonetics and Spoken English	3 0 3	BITS C324	Study Oriented Project	3
HUM C381	Musicology - An Introduction	3 0 3	BITS C331	Computer Projects	3
HUM C382	Sankara's Thoughts	3 0 3	BITS C332	Culture and Significance of Modern Mathematics	3 0 3
HUM C383	Srimad Bhagavad Gita	3 0 3	BITS C333	Project on Organisational Aspects	3
HUM C411	Professional Ethics	3 0 3	BITS C334	Project on Organisational Aspects	3
HUM C412	Heritage of India	3 0 3	BITS C335	Computer Projects	3
HUM C413	Indian Traditions of Science and Technology	3 0 3			
HUM C421	Comparative Religion	3 0 3	BITS C341	Selected Computer Languages	3
HUM C422	Aesthetics	3 0 3			
HUM C431	Theatre Art-Acting and Production	3 0 3	BITS C364	Human – Computer Interaction	3 0 3
MGTS C211	Principles of Management	3 0 3	BITS C372	Data Communications and Networks	3 0 3
MGTS C233	Principles of Marketing for Engineers	3 0 3	BITS C381	TIC Projects	3
PHIL C211	Introductory Philosophy	3 0 3	BITS C382	Reading Course	3
PHIL C221	Symbolic Logic	3 0 3	BITS C383	TIC Projects	3
POL C211	Indian National Movement	3 0 3	BITS C385	Introduction to Gender Studies	3 0 3
POL C212	Modern Political Concepts	3 0 3			
POL C311	Gandhian Thoughts	3 0 3	BITS C386	Quantum Information and Computation	3 0 3
POL C312	Marxian Thoughts	3 0 3			
POL C321	International Relations	3 0 3	BITS C393	Current Affairs	3 0 3
PSY C211	Introduction Psychology	3 0 3	BITS C394	Mass Media Content and Design	3 0 3
PSY C311	Psychology of Human Adjustment	3 0 3	BITS C395	Short Film and Video Production	3 0 3
SOC C211	Dynamics of Social Change	3 0 3	BITS C396	Reporting and Writing for Media	3 0 3
B. Other Courses			BITS C397	Techniques in Social Research	3 0 3
BIO C231	Biology Project Laboratory	3	BITS C398	Creative Multimedia	2 2 3
BITS C214	Introduction to Mass Communication	3 0 3	BITS C432	Entrepreneurship	3 0 3
BITS C217	Environment, Development and Climate Change	3 0 3	BITS C461	Software Engineering	3
BITS C218	Public Policy	3 0 3	BITS C462	Renewable Energy	3 0 3
BITS C224	Corporate Taxation	3 0 3	BITS C463	Cryptography	3 0 3
BITS C313	Lab. Oriented Project	3	BITS C464	Machine Learning	3 0 3
BITS C314	Lab. Oriented Project	3	BITS C467	Bioethics and Biosafety	3 0 3
BITS C320	Managerial Skills	2*	BITS C468	New Venture Creation	3 0 3
BITS C321	Legal and Economic Environment of Business	4*	BITS C469	Financing Infrastructure Projects	3 0 3
BITS C323	Study Oriented Project	3	BITS C471	Management Information Systems	3 0 3

BITS C472	e-Business	3 0 3	CDP C221	Growth of Social Health in India	3 0 3
BITS C473	Nonlinear Dynamics and Chaos	3 0 3	CDP C231	Transport & Communication	3 0 3
BITS C474	Rural Infrastructure Planning	3 0 3	CDP C313	Security Analysis & Portfolio Management	3 0 3
BITS C481	Computer Networks	3 0 3	CDP C323	Functions & Working of Stock Exchanges	3 0 3
BITS C482	Creating and Leading Entrepreneurial Organizations	3 0 3	CDP C332	Contemporary India	3 0 3
BITS C483	Indian Wisdom for Modern Management	3 0 3	CDP C364	Industrial Relations	3 0 3
BITS C484	Introduction to Conflict Management	3 0 3	CDP C371	Development Economics	3 0 3
BITS C485	Marketing Audit	3 0 3	(viii) Electives		
BITS C486	Product & Brand Management	3 0 3	While Table on page IV-8 gives range of electives for the construction of the semester-wise pattern of the programme by the Clause 1.08 Committee, the same Committee will specify the exact number of electives required for each programme (Refer the Semester-wise charts given in later sections). Apart from the electives specified in these charts, students will be allowed to register normally four additional courses as electives. In special cases Clause 1.08 Committee may relax this upper limit on a case by case basis. Students can choose electives from across the offerings of all the courses which are not compulsory to his programme subject to any restrictive conditions described in this Bulletin and in the Academic Regulations. Some of the other courses which can be taken as electives are given below:		
BITS C487	Global Business, Technology & Knowledge Sharing	3 0 3	Emerging Area Courses		
BITS C488	Services Management Systems	3 0 3	EA C342	Computer Aided Design	3
BITS C489	Enterprise Resource Planning	3 0 3	EA C412	Flexible Manufacturing Systems	3 2 4
BITS C493	Business Analysis and Valuation	3 0 3	EA C413	Intelligent Manufacturing System	3 0 3
BITS C494	Environmental Impact Assessment	3 1 4	EA C414	Introduction to Bioinformatics	3 0 3
CHEM C212	Colloid and Surface Chemistry	3 0 3	EA C415	Introduction to MEMS	4
CHEM C231	Chemistry Project Laboratory	3	EA C416	Introduction to Nanoscience	3 0 3
MATH C231	Number Theory	3 0 3	EA C417	Microfluidics and Its Application	4*
PHA C213	Introduction to Physical Pharmacy	2 1 3	EA C422	Fibre Optics and Optoelectronics	3
PHY C231	Physics Project Laboratory	3	EA C441	Robotics	3
PHY C232	Computational Physics	3 0 3	EA C442	Remote Sensing and Image Processing	3
PHY C241	Atmospheric Physics	3 0 3			
PHY C242	Theory of Relativity	3 0 3			
The following Courses on Development Process (CDP) are specially designed for Group C only which cannot be taken by Groups A & B students under any circumstances.					
CDP C211	Agricultural Growth of India	3 0 3			
CDP C212	Industrial Growth of India	3 0 3			

EA C443	Image Processing	3 0 3	Few electives given below are available for all A, B and C group programmes and their units may be one or two depending upon the nature and the duration of the course:			
EA C451	Internetworking Technologies	3 0 3				
EA C452	Mobile Telecommunication Networks	3 0 3		BITS C211	Introduction to IPR	1
EA C461	Artificial Intelligence	3		BITS C212	Introduction to Human Rights	1
EA C462	Superconductivity Theory and Applications	3 0 3		BITS C213	Introduction to Environmental Studies	1
EA C463	Neural Networks and Applications	3 0 3		BITS C318	Workshop on Film Production	1
EA C471	Pattern Recognition	3		BITS C319	Negotiation Skills and Techniques	2 0 2
EA C472	Photovoltaic Devices	3 0 3				
EA C473	Multimedia Computing	3 0 3				
EA C474	Retail Management Systems	3 0 3				
EA C475	Financial Engineering	3 0 3				
EA C476	Power Apparatus and Networks	3 0 3				
EA C477	Foundations of Nanomechanics	3 0 3				
EA C481	Expert Systems	3				
EA C482	Fuzzy Logic and Applications	3 0 3				

(ix) Audit Type Courses

These courses are not part of any programme. They are available on audit only. The registration in these courses is permitted after payment of due fees in addition to the semester fees. The available audit type courses normally are as follows.

BITS N101T	Physical fitness and Wellness	1
CHI N101T	Beginning Chinese	3 0 3
FRE N101T	Beginning French	3 0 3
FRE N102T	Technical French	3 0 3
GER N101T	Beginning German	3 0 3
GER N102T	Technical German	3 0 3
JAP N101T	Beginning Japanese	3 0 3
MUSIC N103T	Indian Classical Music (Vocal) I	3*
MUSIC N104T	Indian Classical Music (Vocal) II	3*
MUSIC N203T	Indian Classical Music (Vocal) III	3*
MUSIC N204T	Indian Classical Music (Vocal) IV	3*
MUSIC N113T	Indian Classical Music (Instrumental) I	3*
MUSIC N114T	Indian Classical Music (Instrumental) II	3*
MUSIC N213T	Indian Classical Music (Instrumental) III	3*

While each programme has a unique number of courses under the 'elective' category, the option embedded in the range shown against each category in the category-wise chart may not be mistaken to be an 'elective'. Thus each student is required to take courses within the range of minimum to maximum from the uniquely Core courses in each category. The list is not open-ended and is also not negotiable. For fulfilling the elective category, theoretically speaking, a student can choose any course listed in this Bulletin if that course is not a Core compulsory course of his/her programme, provided he/she fulfils the prerequisite and the prior preparation requirements and any other restrictive condition.

Apart from the courses described here, a student can also take courses of the higher degree programmes as electives subject to any pre-requisite and other restrictions.

A wise choice within the range prescribed in each category supplemented by planned deployment of the electives can prepare an individual student for a multi-faceted professional aspiration.

MUSIC N214T	Indian Classical Music (Instrumental) IV	3*	course structure for M.Sc.(Tech.) General studies is designed in such a way that a student admitted to this programme will be taking humanities courses as well as certain general science and technology courses. The set of first year courses of this programme is therefore different from those of other M.Sc.(Tech.) programmes. (see the semester-wise pattern later in this section).
MUSIC N303T	Advanced Indian Music Practice (Vocal)	0	
MUSIC N313T	Advanced Indian Music Practice (Instrumental)	0	

For a student with advanced standing or on transfer, the number of courses to be done in each category will be decided anywhere in the range depending on the estimate of courses he/she has done before the point of admission with advanced standing or transfer.

The above is the general guideline, but it must be remembered that each student or a category of students will be given a complete semester-wise pattern for the duration of the programme as is illustrated by the type of semester-wise patterns presented in this Bulletin.

Special features of Group C Programmes

The semester-wise patterns for M.Sc. (Tech.) Information Systems, M.Sc.(Tech.) Engineering Technology and M.Sc.(Tech.) Finance are designed in such a way that the first year is common with A and B groups. This allows the students of these programmes to benefit in terms of saving time if they are allowed to exercise their options for any of the flexibilities of seeking for a transfer or dual degree into Group A or B. The

But the structure of Group C programmes permits the possibility of an individual student, to combine in his/her programme specially in the categories of core mathematics and core science courses, a combination of courses which require high dependence on mathematics and analysis or science courses which are more narrative and integrated at the conceptual plane. In view of this, students admitted to M.Sc.(Tech.) Information Systems, M.Sc.(Tech.) Engineering technology and M.Sc.(Tech.) Finance programmes will be given an opportunity to choose the first year courses mentioned against M.Sc.(Tech.) General studies programme, instead of the first year courses mentioned in their semester-wise patterns. This will allow the student to have an understanding of modern science and mathematics, their methodology and their conceptual approach without the necessity of rigorous training in the mathematical understanding and manipulation. However, such an option can be exercised only with prior permission from appropriate authority.

Category wise Structure of Groups A, B & C Programmes's students who have been admitted in 2010 or earlier

Programme → Category ↓	A, B, C Programmes Except M.Sc. (Tech.) General Studies		M.Sc. (Tech.) General Studies	
	No. of Units Required	No. of Courses Required	No. of Units Required	No. of Courses Required
Language and Literature	0-15	0-5	0-15	0-5
Core Science	8-23	3-7	8-23	3-7
Core Mathematics	6-12	2-4	6-15	2-5
Technical Arts	12-26	4-8	12-21	4-7
Engg. Science	6-24	2-8	6-21	2-7
AAOC	8-24	3-8	9-27	3-9
HSS & Other Courses	3-33	1-10	9-45	3-15
CDC	15-40	6-10	-	-
Elective	12-40	5-10	12-40	5-10
Sub Total	125 (Min.)	42 (Min.)	125 (Min.)	42 (Min.)
PS I & II	25	2	25	2
OR	OR	OR	OR	OR
Thesis & Seminar	16	2	16	2
Total	140 (Min)	44 (Min.)	140 (Min.)	44 (Min.)

Pattern 1 Semester-wise Pattern for Students Admitted to Group A and Group B Admitted in First Semester						
Year	First Semester			Second Semester		
I	BIO	C111	General Biology	AAOC	C111	Probability and Statistics
	CHEM	C141	Chemistry I	CHEM	C142	Chemistry II
	ES	C112	Thermodynamics	MATH	C192	Mathematics II
	MATH	C191	Mathematics I	PHY	C132	Physics II
	PHY	C131	Physics I	TA	C112	Workshop Practice
	TA	C111	Engineering Graphics	TA	C162	Computer Programming I
II	ES	C241	Electrical Sciences I	ES	C242	Structure and Properties of Materials
	MATH	C241	Mathematics III	ES	C272	Electrical sciences II
	TA	C252	Computer Programming II	CE	C212	Transport Phenomena I
	BIO	C211	Biological Chemistry (for Bio, BIOT, Pharm)	ME	C212	(for Civil, Mech., MF)
	BIO	C241	Microbiology (for Bio, BIOT)	MF	C212	
	ECON	C212	Principles of Economics (for Econ, Pharm)	CHE	C213	Fluid Flow Operations (for Che)
	ES	C221	Mechanics of Solids (for Engg)	CE	C241	Analysis of Structures (for Civil)
	MGTS	C211	Principles of Management (Exptl Sc, Math, BIOT, Che, MF)	CHE	C221	Chemical Process Calculations (for Che)
	PHA	C241	Microbiology (for Pharm)	CHEM	C211	Atomic & Molecular Structures (for Chem)
	PHY	C221	Modern Physics (for Phy)	CHEM	C232	Chemistry of Organic Compounds (for Chem, Pharm)
	SOC	C211	Dynamics of Social Change (for Econ)	ECON	C211	Fundamentals of Finance & Accounting (for Econ)
	TA	C211	Measurement Techniques I (for Econ, Engg, Exptl Sc, Math, Pharm)	EEE	C272	} Circuits & Signals (for EEE, ECE, EI)
	TA	C312	Technical Report Writing (for Engg, except BIOT, Che, MF)	ECE	C272	
	Elective	1	(for Chem, Math)	INSTR	C272	
				ES	C263	Microprocessor Programming & Interfacing (for CS, EEE, ECE, EI)
				MATH	C222	Discrete Structures for Computer Science (for CS)
				ME	C211	} Applied Thermodynamics (for Mech, MF)
				MF	C211	
				MGTS	C211	Principles of Management (for Econ, Pharm, Engg except BIOT, Che, MF)
				PHA	C212	Pharmaceutical Analysis (for Pharm)
			TA	C222	Measurement Techniques II (for Econ, Engg, Exptl Sc, Math)	
			TA	C312	Technical Report Writing (for Econ, BIOT, Che, MF, Exptl Sc, Math, Pharm)	
			BIOT	C216	Introductory Molecular Biology (for BIOT)	
			Electives	2	(for Bio, Math, Phy)	
Summer BITS C221 Practice School I (for PS Option Only)						
III	Compulsory Discipline Courses*			Compulsory Discipline Courses*		
	AAOC	C222	Optimisation	AAOC	C312	Operations Research
	AAOC	C221	Graphs and Networks (for Math)	AAOC	C321	Control Systems (for BIOT, Civil, Mech., MF, CS)
	AAOC	C311	Data Processing (for Econ, Math)	AAOC	C341	Numerical Analysis (for Che, EEE, ECE, EI, Exptl. Sc., Math)
	AAOC	C321	Control Systems (for Che, EEE, ECE, EI)	Elective	1	(for Econ, Pharm)
	AAOC	C341	Numerical Analysis (for BIOT, Civil, Mech., MF, CS)			
	BIO	C391	} Instrumental Methods of Analysis (for Exptl Sc, Pharm)			
	CHEM	C391				
	PHA	C391				
	PHY	C391				
PHY	C212	Classical Mechanics (for Phy)				
Elective	1	(for Bio, Chem, Econ)				
IV	Electives	5	(for Bio, Pharm.)	BITS	C412	Practice School II OR
		6	(for BIOT, Chem, Econ, Engg, Math, Phy)	BITS	C422T	Thesis
				BITS	C442T	Seminar

Note : This is operative pattern for the students who have been admitted in 2010 or earlier as approved by the Senate-appointed committee, subject to change if the situation warrants

* These are specialized discipline courses to be selected from a pool of courses. Their total number will range from six to nine. Details are given elsewhere in this Part.

Pattern 2 Semester wise Pattern for Students Admitted to Group A and Group B Admitted in Second Semester		
Year	First Semester	Second Semester
I		BIO C111 General Biology CHEM C141 Chemistry I MATH C191 Mathematics I PHY C131 Physics I TA C112 Workshop Practice TA C162 Computer Programming I
II	CHEM C142 Chemistry II ES C112 Thermodynamics MATH C192 Mathematics II PHY C132 Physics II TA C111 Engineering Graphics TA C252 Computer Programming II	AAOC C111 Probability and Statistics ES C242 Structure and Prop. of Materials MATH C241 Mathematics III MGTS C211 Principles of Management TA C312 Technical Report Writing Elective 1
III	AAOC C222 Optimisation ES C241 Electrical Sciences I AAOC C311 Data Processing (for Math) BIO C211 Biological Chemistry (for Bio, BIOT, Pharm) BIO C241 } Microbiology (for Bio, BIOT, Pharm) PHA C241 } ECON C212 Principles of Economics (for Econ, Pharm) ES C221 Mechanics of Solids (for Engg) PHY C212 Classical mechanics (for Phy) PHY C221 Modern Physics (for Phy) SOC C211 Dynamics of Social Change (for Econ) TA C211 Measurement Techniques I (for Econ, Engg, Exptl Sc, Math, Pharm) Elective 1 (for Bio, Econ, Phy) Electives 2 (for BIOT, Che, Chem, Civil, CS, EEE, ECE, E, Math, Mech., MF)	ES C272 Electrical Sciences II AAOC C312 Operations research AAOC C321 Control Systems (for Civil, Mech, MF, CS) AAOC C341 Numerical Analysis (for Che, EEE, ECE, El, Exptl Sc., Math) BIOT C216 Introductory Molecular Biology (for BIOT) CE C212 } ME C212 } Transport Phenomena I (for Civil, Mech, MF) MF C212 } CE C241 Analysis Structures (for Civil) CHE C213 Fluid Flow Operations (for Che) CHE C221 Chemical Process Calculations (for Che) CHEM C211 Atomic & Molecular Structures (for Chem) CHEM C232 Chemistry of Organic Compounds (for Chem, Pharm) ECON C211 Fundamentals of Finance & Accounting (for Econ) EEE C272 } ECE C272 } Circuits & Signals (for EEE, ECE, El) INSTR C272 } ES C263 Microprocessor Programming & Interfacing (for CS, EEE, ECE, El) MATH C222 Discrete Structures for Computer Science (for CS) ME C211 } MF C211 } Applied Thermodynamics (for Mech, MF) PHA C212 Pharmaceutical Analysis (for Pharm) TA C222 Measurement Techniques II (for Econ, Engg, Exptl Sc, Math) Elective 1 (for BIOT, Chem) Electives 2 (for Bio, Econ, Math, Pharm, Phy)
Summer	BITS C221 Practice School I (For PS Option only)	
IV	Compulsory Discipline Courses* AAOC C221 Graphs and Networks (for Math) AAOC C311 Data Processing (for Econ) AAOC C321 Control Systems (for Che, ECE, EEE, El) AAOC C341 Numerical Analysis (for BIOT, Civil, Mech., MF, CS) BIO C391 } CHEM C391 } Instrumental Methods of Analysis (for Exptl Sc, BIOT, Pharm) PHA C391 } PHY C391 } Elective 1 (for Che, Civil, CS, EEE, ECE, El, Mech, MF, Pharm) Electives 2 (for BIOT, Econ, Math, Exptl Sc)	Compulsory Discipline Courses* Electives 2
V	BITS C412 Practice School II OR BITS C422T Thesis BITS C442T Seminar	

Note : This is operative pattern for the students who have been admitted in 2010 or earlier as approved by the Senate-appointed committee, subject to change if the situation warrants.

* These are specialized discipline courses to be selected from a pool of courses. Their total number will range from six to nine. Details are given elsewhere in this Part.

Pattern 1		Semester-wise Pattern for Students Admitted to Group C M.Sc. (Tech.) Engineering Technology, Information Systems, Finance admitted in First Semester				
Year	First Semester			Second Semester		
I	CHEM C141	Chemistry I	AAOC C111	Probability & Statistics		
	ES C112	Thermodynamics	CHEM C142	Chemistry II		
	BIO C111	General Biology	MATH C192	Mathematics II		
	MATH C191	Mathematics I	PHY C132	Physics II		
	PHY C131	Physics I	TA C112	Workshop Practice		
	TA C111	Engineering Graphics	TA C162	Computer Programming I		
II	ECON C212	Principles of Economics	ENGG C212	Introduction to Systems		
	ENGG C111	Electrical and Electronics Technology	ES C261	Digital Electronics and Microprocessors (for ET, IS)		
	ENGG C241	Mechanical Technology (for ET)	MGTS C211	Principles of Management		
	ENGG C264	Fluid & Solid Mechanics (for ET)	TA C312	Technical Report Writing		
	TA C252	Computer Programming II	TOC C223	Comfort Conditioning & Refrigeration (for ET)		
	TOC C213	Civil Engineering Practice (for ET)	TOC C244	Production & Processing (for ET)		
	TOC C235	Electrical & Electronics Engineering Practice (for ET,IS)	TOC C224	Corporate Taxation (for Fin.)		
	AAOC C221	Graphs & Networks (for IS)	MATH C222	Discrete Structures for Computer Science (for IS)		
	AAOC C311	Data Processing (for Fin.)	SOC C211	Dynamics of Social Change (for IS, Fin.)		
	ES C233	Logic in Computer Science (for IS)	ECON C211	Fundamentals of Finance & Accounting (for Fin.)		
	BITS C321	Legal and Economic Environment of Business (for Fin.)				
	HUM C351	Public Administration (for Fin.)				
	TA C231	Business Communication (for Fin.)				
	MATH C241	Mathematics III (for IS)				
Summer	BITS C221 Practice School I 5 Units (for PS Option Only)					
III	Compulsory Discipline Courses*			Compulsory Discipline Courses*		
	AAOC C222	Optimization	AAOC C312	Operations Research		
	ENGG C232	Engineering Materials (for ET)	CDP C364	Industrial Relations (for ET)		
	ENGG C242	Maintenance and Safety (for ET)	AAOC C341	Numerical Analysis (for IS)		
	CDP C323	Functions and Working of Stock Exchanges (for Fin.)	BITS C471	Management Information Systems (for Fin.)		
	Elective	1 (for IS, Fin.)	CDP C313	Security Analysis and Portfolio Management (for Fin.)		
IV	Electives 5			BITS C412	Practice School II	
				OR		
				BITS C422T	Thesis	
				BITS C442T	Seminar	

Note : This is operative pattern for the students who have been admitted in 2010 or earlier as approved by the Senate-appointed committee, subject to change if the situation warrants.

* These are specialized discipline courses to be selected from a pool of courses. Their total number will range from six to nine. Details are given elsewhere in this Part.

Pattern 2			Semester-wise Pattern for Students Admitted to Group C			
M.Sc. (Tech.) Engineering Technology, Information Systems, Finance admitted in Second Semester						
Year	First Semester			Second Semester		
I				CHEM C141	Chemistry I	
				BIO C111	General Biology	
				MATH C191	Mathematics I	
				PHY C131	Physics I	
				TA C111	Engineering Graphics	
				TA C162	Computer Programming I	
II	CHEM C142	Chemistry II	ENGG C212	Introduction to Systems		
	MATH C192	Mathematics II	MGTS C211	Principles of Management		
	ES C112	Thermodynamics	TOC C244	Production & Processing (for ET)		
	PHY C132	Physics II	AAOC C111	Probability & Statistics		
	TA C112	Workshop Practice	TA C312	Technical Report Writing (for ET)		
	TA C252	Computer Programming II	ES C233	Logic in Computer Science (for IS)		
			SOC C211	Dynamics of Social Change (for IS, Fin.)		
			HUM C351	Public Administration (for Fin.)		
			TOC C224	Corporate Taxation (for Fin.)		
			Elective	1 (for ET, IS)		
III	ECON C212	Principles of Economics	AAOC C312	Operations Research (for ET, Fin.)		
	ENGG C241	Mechanical Technology (for ET)	CDP C364	Industrial Relations (for ET)		
	ENGG C242	Maintenance & Safety (for ET)	MATH C222	Discrete Structures for Computer Science (for IS)		
	ENGG C264	Fluid & Solid Mechanics (for ET)	TOC C223	Comfort Conditioning and Refrigeration (for ET)		
	TOC C213	Civil Engineering Practice (for ET)	ES C261	Digital Electronics and Microprocessors (for ET, IS)		
	TOC C235	Electrical & Electronics Engineering Practice (for ET, IS)	AAOC C341	Numerical Analysis (for IS)		
	ENGG C111	Electrical & Electronics Technology	TA C312	Technical Report Writing (for IS, Fin.)		
	AAOC C221	Graphs & Networks (for IS)	CDP C313	Security Analysis & Portfolio Management (for Fin.)		
	AAOC C311	Data Processing (for Fin.)	ECON C211	Fundamentals of Finance & Accounting (for Fin.)		
	BITS C321	Legal and Economic Environment of Business (for Fin.)	Electives	2 (for ET, IS, Fin.)		
	TA C231	Business Communication (for Fin.)				
	MATH C241	Mathematics III (for IS)				
	Elective	1 (for IS, Fin.)				
Summer	BITS C221 Practice School I 5 Units (for PS Option only)					
IV	Compulsory Discipline Courses*			Compulsory Discipline Courses*		
	AAOC C222	Optimization	AAOC C312	Operations Research (for IS)		
	ENGG C232	Engineering Materials (for ET)	BITS C471	Management Information Systems Exchanges (for Fin.)		
	CDP C323	Functions and Working of Stock Exchanges (for Fin.)	Elective	1 (for ET, IS)		
	Elective	1 (for ET, IS, Fin.)	Electives	2 (for Fin.)		
V	BITS C412	Practice School II OR				
	BITS C422T	Thesis				
	BITS C422T	Seminar				

Note: This is operative pattern for the students who have been admitted in 2010 or earlier as approved by the Senate-appointed committee, subject to change if the situation warrants.

* These are specialized discipline courses to be selected from a pool of courses. Their total number will range from six to nine. Details are given elsewhere in this Part.

Pattern 1 Semester-wise Pattern for Students Admitted to M.Sc. (Tech.) General Studies in First Semester										
Year	First Semester				U	Second Semester				U
I	CHEM	C221	General Chemistry	3	AAOC	C111	Probability & Statistics	3		
	ENGG	C111	Electrical & Electronics Technology	3	BIO	C111	General Biology	3		
					MATH	C192	Mathematics II	3		
	ENGL	C123	English Language Skills	3	PSY	C211	Introductory Psychology	3		
	MATH	C191	Mathematics I	3	TA	C112	Workshop Practice	4		
	PHY	C122	General Physics	3	TA	C162	Computer Programming I	3		
	TA	C111	Engineering Graphics	4						
II	ECON	C212	Principles of Economics	3	AAOC	C311	Data Processing	3		
	ENGG	C212	Introduction to Systems	3	MGTS	C211	Principles of Management	3		
	TA	C252	Computer Programming II	3	SOC	C211	Dynamics of Social Change	3		
	BITS	C216	Selected Readings	3	TA	C312	Technical Report Writing	3		
	BITS	C217	Environment, Development & Climate Change ²	3	BITS	C214	Introduction to Mass Communication ¹	3		
	CDP	C221	Growth of Social Health in India ²	3	ENGL	C261	Creative Writing ¹	3		
					PHIL	C221	Symbolic Logic ²	3		
	TA	C231	Business Communication ¹	3	POL	C212	Modern Political Concepts ²	3		
TOC	C215	Language Lab Practice ¹	3							
Summer				BITS C221 Practice School I				5 Units		
(For PS Option Only)										
III	AAOC	C222	Optimization	3	AAOC	C312	Operation Research	3		
	ENGL	C353	Effective Public Speaking	3	CDP	C332	Contemporary India	3		
	BITS	C393	Current Affairs ¹	3	HUM	C351	Public Administration	3		
	BITS	C394	Mass Media Content and Design ¹	3	BITS	C385	Introduction to Gender Studies ²	3		
	BITS	C396	Reporting and Writing for Media ¹	3	BITS	C395	Short Film & Video Production ¹	3		
	HSS	C313	Critical Analysis of Literature and Cinema ¹	3	HSS	C314	Print & Audio Visual Advertising ¹	3		
	BITS	C484	Introduction to Conflict Management ²	3	BITS	C397	Techniques in Social Research ²	3		
	BITS	C487	Global Business, Technology & Knowledge Sharing ²	3			Elective	3		
	CDP	C371	Development Economics ²	3						
			3							
IV	Elective(s) 6			18	BITS	C412	Practice School II	20		
					OR					
					BITS	C422T	Thesis	15		
				BITS	C442T	Seminar	1			

- Note:
- The Units mentioned for Electives are minimum units and in actual cases they may be more, depending upon the nature of the course.
 - This is operative pattern for the students who have been admitted in 2010 or earlier as approved by the Senate-appointed committee, subject to change if the situation warrants.
 - As there is no clearly defined set of so-called discipline courses in respect of the M.Sc. (Tech.) General Studies Programme, the courses with superscript 1 mentioned in the above chart have been introduced for Communication and Media Studies stream and the courses with superscript 2 have been introduced for Developmental Studies stream. Courses with no superscript are common for both the streams.

Pattern 2 Semesterwise Pattern for Students Admitted to Group C: M.Sc.(Tech.) General Studies in Second Semester								
Year	First Semester			U	Second Semester			U
I					AAOC	C111	Probability & Statistics	3
					BIO	C111	General Biology	3
					MATH	C191	Mathematics I	3
					PSY	C211	Introductory Psychology	3
					TA	C111	Engineering Graphics	4
					TA	C162	Computer Programming I	3
II	CHEM	C221	General Chemistry	3	MATH	C192	Mathematics II	3
	ENGG	C111	Electrical & Electronics Technology	3	MGTS	C211	Principles of Management	3
	ENGL	C123	English Language Skills	3	SOC	C211	Dynamics of Social Change	3
	BITS	C216	Selected Readings	3	TA	C312	Technical Report Writing	3
	PHY	C122	General Physics	3	BITS	C214	Introduction to Mass Communication ¹	3
	TA	C112	Workshop Practice	4	PHIL	C221	Symbolic Logic ²	3
	TA	C252	Computer Programming II	3			Elective	3
III	ECON	C212	Principles of Economics	3	CDP	C332	Contemporary India	3
	ENGG	C212	Introduction to Systems	3	HUM	C351	Public Administration	3
	BITS	C217	Environment, Development & Climate Change ²	3	AAOC	C311	Data Processing	3
	CDP	C221	Growth of Social Health in India ²	3	ENGL	C261	Creative Writing ¹	3
	TA	C231	Business Communication ¹	3	POL	C212	Modern Political Concepts ²	3
	TOC	C215	Language Lab Practice ¹	3			Elective (2)	6
	HSS	C313	Critical Analysis of Literature and Cinema ¹	3				
	CDP	C371	Development Economics ²	3				
			Elective	1				
Summer BITS C221 Practice School-I 5 Units (for PS Option only)								
IV	AAOC	C222	Optimization	3	AAOC	C312	Operation Research	3
	ENGL	C353	Effective Public Speaking	3	BITS	C395	Short Film & Video Production ¹	3
	BITS	C393	Current Affairs ¹	3	HSS	C314	Print & Audio Visual Advertising ¹	3
	BITS	C394	Mass Media Content and Design ¹	3	BITS	C385	Introduction to Gender Studies ²	3
	BITS	C396	Reporting and Writing for Media ¹	3	BITS	C397	Techniques in Social Research ²	3
	BITS	C484	Introduction to Conflict Management ²	3			Electives(3)	9
	BITS	C487	Global Business, Technology & Knowledge Sharing ²	3				
		Elective ²	3					
V	BITS	C412	Practice School II OR					
	BITS	C422T	Thesis					
	BITS	C442T	Seminar					

- Note :
- This is operative pattern for the students who have been admitted in 2010 or earlier as approved by the Senate-appointed committee, subject to change if the situation warrants.
 - As there is no clearly defined set of so-called discipline courses in respect of the M.Sc. (Tech.) General Studies Programme, the courses with superscript 1 mentioned in the above chart have been introduced for Communication and Media Studies stream and the courses with superscript 2 have been introduced for Developmental Studies stream. Courses with no superscript are common for both the streams.

(x) Specialized Discipline Courses

All the courses marked (#) are the courses currently decided to be Compulsory Discipline Courses (CDC) by the Clause 1.08 Committee. In addition, one or two courses are required to be taken compulsorily in some Disciplines from the courses marked (*). The remaining courses will be available as electives under the category Discipline Courses Other than Compulsory (DCOC).

Course No.	Course Title	L	P	U
#BIO C339	Biophysical Chemistry ²	3	0	3
BIO C343	Genomics	3	0	3
BIO C344	Proteomics	3	0	3
BIO C345	Immunotechnology	3	0	3
#BIO C346	Experiments in Biotechnology	0	9	3
BIO C413	Molecular Biology of Cell	3	0	3
BIO C416	Immunology	3	0	3
BIO C417	Biomolecular Modeling	3	0	3
#BIO C418	Genetic Engineering Techniques ¹	1	9	4
#BIO C461	Recombinant DNA Technology ²	3	0	3
BIO C491	Special Projects			3
EA C414	Introduction to Bioinformatics	3	0	3
Biological Sciences				
# BIO C312	Developmental Biology ²	3	0	3
# BIO C321	Cell Biology ¹	3	0	3
# BIO C322	Ecology ²	3	0	3
# BIO C331	Biophysics ¹	3	0	3
# BIO C332	Genetics ²	3	0	3
# BIO C342	General Physiology ¹	3	0	3
BIO C352	Cell and Tissue Culture Technology	3	0	3
# BIO C411	Laboratory ²	0	9	3
BIO C412	Introduction to Bioinformatics	3	0	3
BIO C413	Molecular Biology of Cell	3	0	3
BIO C416	Immunology	3	0	3
BIO C417	Biomolecular Modeling	3	0	3
BIO C418	Genetic Engineering Techniques	1	9	4
BIO C419	Molecular Evolution	3	0	3
BIO C421	Enzymology	3	0	3
BIO C431	Reproductive Physiology	3	0	3
BIO C441	Biochemical Engineering	3	0	3
BIO C451	Bioprocess Technology			3
BIO C461	Recombinant DNA Technology	3	0	3
BIO C491	Special Projects			3
Biotechnology				
#BIO C332	Genetics ¹	3	0	3
#BIO C336	Cell Physiology ¹	3	0	3
#BIO C337	Industrial Microbiology & Bioprocess Engineering ¹	2	3	4
#BIO C338	Introduction to Environmental Biotechnology ²	3	0	3
Chemical Engineering				
#CHE C311	Chemical Engineering Thermodynamics ¹	3	0	3
#CHE C312	Kinetics and Reactor Design ²	3	0	3
#CHE C322	Chemical Process Technology ²	3	0	3
#CHE C351	Heat Transfer Operations ¹	3	3	4
#CHE C332	Process Design Decisions ²	3	0	3
#CHE C361	Mass Transfer Operations ¹	3	0	3
CHE C411	Environmental Pollution Control	3	0	3
CHE C412	Process Equipment Design	3	0	3
CHE C413	Process Plant Safety	3	0	3
CHE C414	Transport Phenomena	3	0	3
CHE C421	Biochemical Engineering	3	0	3
CHE C422	Combustion Engineering	3	0	3
#CHE C431	Selected Chemical Engineering Operations ¹	3	3	4
CHE C432	Computer Aided Process Plant Design	3	0	3
CHE C433	Corrosion Engineering	3	0	3
#CHE C441	Process Control ²	3	0	3
CHE C471	Refrigeration and Air Conditioning	3	0	3
CHE C473	Advanced Process Control	3	1	4
CHE C491	Special Projects			3
Chemistry				
#CHEM C311	Chemical Kinetics ¹	3	0	3

1 Compulsory Discipline Course normally offered in First Semester.

2 Compulsory Discipline Course normally offered in Second Semester.

CHEM C312	Chemistry of Nontransitional Elements	3 0 3	CE C411	Transportation Engineering	3 0 3
#CHEM C321	Chemical Thermodynamics ¹	3 0 3	CE C412	Disaster Management	3 0 3
#CHEM C322	Quantum Chemistry ¹	3 0 3	CE C414	Introduction to Environmental Engineering	3 0 3
#CHEM C331	Structure and Reactivity of Organic Compounds ¹	3 0 3	CE C415	Design of Prestressed Concrete Structures	3 0 3
#CHEM C332	Synthetic Organic Chemistry ²	3 0 3	CE C416	Computer Application in Civil Engineering	3 2 4
* CHEM C341	Biophysical Chemistry	3 0 3	CE C417	Applications of Artificial Intelligence in Civil Engineering	3 0 3
CHEM C342	Coordination Chemistry	3 0 3	CE C418	Introduction to Water Resources Engineering	3 0 3
* CHEM C351	Computational Chemistry	3 3 4	CE C419	Geotechnical Earthquake Engineering and Machine Foundation	3 0 3
#CHEM C352	Bonding in Inorganic Compounds ²	3 0 3	CE C422	Design of Bridge Structures	3 0 3
* CHEM C361	Polymer Chemistry	3 0 3	CE C432	Structural Dynamics	3 0 3
* CHEM C362	Chemistry of Inorganic Compounds	3 0 3	CE C441	Design of Water Resources Systems	3 0 3
#CHEM C411	Chemical Experimentation ²	0 9 3	CE C461	Refrigeration and Air Conditioning	3 0 3
CHEM C412	Photochemistry and Laser Spectroscopy	3 0 3	CE C471	Introduction to Finite Element Methods	3 0 3
CHEM C421	Theoretical Inorganic Chemistry	3 0 3	CE C491	Special Projects	3
* CHEM C422	Statistical Thermodynamics	3 0 3	Computer Science		
* CHEM C431	Stereochemistry and Reaction Mechanisms	3 0 3	CS C313	Object Oriented Programming and Design	3 2 4
CHEM C441	Biochemical Engineering	3 0 3	CS C314	Software Development for Portable Devices	2 2 3
CHEM C451	Physical Pharmacy	2 3 3	CS C321	Computers and Programming	3 2 4
CHEM C461	Nuclear & Radiochemistry	3 0 3	#CS C342	Advanced Computer Organization ²	3 0 3
CHEM C491	Special Projects	3	#CS C351	Theory of Computation ¹	3 0 3
Civil Engineering			#CS C352	Data Base Systems ²	3 0 3
# CE C322	Construction Planning and Technology ²	3 0 3	#CS C362	Programming Languages & Compiler Construction ²	3 0 3
#CE C342	Water and Waste Water Treatment ²	3 2 4	#CS C363	Data Structures and Algorithms ¹	3 2 4
#CE C361	Soil Mechanics and Foundation Engineering ¹	3 2 4	#CS C372	Operating Systems ¹	3 0 3
#CE C371	Hydraulics and Fluid Mechanics ¹	3 2 4	#CS C391	Digital Electronics and Computer Organization ¹	3 3 4
#CE C381	Design of Steel Structures ¹	3 0 3	CS C414	Telecommunication Switching Systems & Networks	3 0 3
#CE C383	Design of Concrete Structures ²	3 2 4	CS C415	Data Mining	3 0 3
#CE C391	Transportation Engineering ²	3 2 4			
#CE C392	Geodesy ¹	3 2 4			
CE C394	Green Buildings & Energy Conservation	3 0 3			

1 Compulsory Discipline Course normally offered in First Semester.

2 Compulsory Discipline Course normally offered in Second Semester.

CS C422	Parallel Computing	3 0 3		Electrical & Electronics Engineering	
CS C424	Software for Embedded Systems	3 0 3	CS C341	Data Structures & Algorithms	3 0 3
CS C441	Selected Topics from Computer Science	3	# EEE C364	Analog Electronics ²	3 3 4
CS C442	Advanced Algorithms & Complexity	3 0 3	# EEE C371	Electromechanical Energy Conversion ¹	3 3 4
CS C444	Real-Time Systems	3 0 3	* EEE C374	Power Systems	3 0 3
CS C446	Data Storage Technologies and Networks	3 0 3	# EEE C381	Electronic Devices & Integrated Circuits ¹	3 0 3
CS C451	Combinatorial Mathematics	3 0 3	# EEE C383	Communication Systems ²	3 3 4
CS C453	Discrete Mathematical Structures	3 0 3	# EEE C391	Digital Electronics and Computer Organization ¹	3 3 4
#CS C461	Computer Networks ²	3 0 3	* EEE C414	Telecommunication Switching Systems & Networks	3 0 3
CS C471	Computer Graphics	2 2 3			
CS C481	Graphical User Interfaces	3 0 3	EEE C415	Digital Signal Processing	3 0 3
CS C491	Special Projects	3	EEE C416	Digital Communication	3 0 3
	Economics		EEE C417	Computer Based Control Systems	3 0 3
#ECON C311	Microeconomics ¹	3 0 3	EEE C418	Digital Systems	3 0 3
#ECON C321	Macroeconomics ¹	3 0 3	EEE C422	Modern Control Systems	3 0 3
#ECON C322	Public Finance: Theory and Practice ²	3 0 3	EEE C423	Combinatorial Mathematics	3 0 3
#ECON C341	Economics of Growth & Planning ¹	3 0 3	#EEE C424	Microelectronic Circuits ¹	3 0 3
#ECON C342	Econometrics ²	3 0 3	EEE C432	Medical Instrumentation	3 0 3
#ECON C362	Money, Banking and Financial Markets ²	3 0 3	* EEE C433	Electromagnetic Fields & Waves	3 0 3
#ECON C372	International Trade and Balance of Payments ²	3 0 3	EEE C441	Television Engineering	3 0 3
ECON C411	Project Appraisal	3 0 3	* EEE C443	Analog & Digital VLSI Design	3 0 3
ECON C412	Security Analysis & Portfolio Management	3 0 3	EEE C444	Real-Time Systems	3 0 3
ECON C422	Functions & Working of Stock Exchanges	3 0 3	EEE C452	Electromagnetic Fields & Microwave Engineering	3 0 3
ECON C431	Regional Economics	3 0 3	EEE C453	Discrete Mathematical Structures	3 0 3
ECON C436	Strategic Financial Management	3 0 3	* EEE C461	Power Electronics	3 0 3
ECON C451	Technology Forecasting	3 0 3	EEE C462	Advanced Power Systems	3 0 3
ECON C461	Analysis of Indian Economy	3 0 3	EEE C471	Electronic Measurements and Instrumentation	3 0 3
ECON C471	Resources and Environmental Economics	3 0 3	EEE C472	Satellite Communication	3 0 3
ECON C481	Financial Management	3 0 3	EEE C491	Special Projects	3
ECON C491	Special Projects	3		Electronics & Communication Engineering	
			CS C341	Data Structures and Algorithms	3 0 3

1 Compulsory Discipline Course normally offered in First Semester.

2 Compulsory Discipline Course normally offered in Second Semester.

CS C461	Computer Networks	3 0 3	INSTR C414	Telecommunication Switching Systems & Networks	3 0 3
EA C473	Multimedia Computing	3 0 3			
# ECE C313	Microelectronic Circuits ¹	3 0 3	INSTR C421	Digital Systems	3 0 3
# ECE C364	Analog Electronics ²	3 3 4	INSTR C444	Real-Time Systems	3 0 3
# ECE C383	Communication Systems ¹	3 3 4	* INSTR C451	Process Control	3 0 3
# ECE C391	Digital Electronics and Computer Organization ¹	3 3 4	* INSTR C461	Power Electronics	3 0 3
# ECE C392	Modern Communication Technologies ¹	3 0 3	* INSTR C471	Electronic Measurements and Instrumentation	3 0 3
# ECE C393	Information Theory & Coding ²	3 0 3	INSTR C481	Medical Instrumentation	3 0 3
# ECE C394	Communication Networks ²	3 0 3	INSTR C491	Special Projects	3
# ECE C452	Electromagnetic Fields & Microwave Engineering ¹	3 0 3			
ECE C491	Special Projects	3			
EEE C414	Telecommunications Switching Systems and Networks	3 0 3			
EEE C415	Digital Signal Processing	3 0 3			
EEE C416	Digital Communication	3 0 3			
EEE C443	Analog and Digital VLSI Design	3 0 3			
EEE C472	Satellite Communication	3 0 3			
Electronics & Instrumentation Engineering					
CS C341	Data Structures & Algorithms	3 0 3			
* EEE C381	Electronic Devices & Integrated Circuits	3 0 3			
#INSTR C312	Industrial Instrumentation and Control ²	3 0 3			
#INSTR C313	Microelectronic Circuits ¹	3 0 3			
#INSTR C355	Electronic Instruments and Instrumentation Technology ²	3 3 4			
#INSTR C364	Analog Electronics ²	3 3 4			
* INSTR C371	Electromechanical Energy Conversion	3 3 4			
#INSTR C381	Transducers & Measurement Systems ¹	3 0 3			
#INSTR C391	Digital Electronics and Computer Organization ¹	3 3 4			
* INSTR C392	Analysis Instrumentation	3 0 3			
INSTR C411	Opto-Electronic Instruments	3 0 3			
Engineering Technology					
# ET C341	Instrumentation and Control ¹	3 0 3			
# ET C342	Materials Management ²	3 0 3			
# ET C351	Chemical Process Technology ²	3 0 3			
# ET C352	Energy Management ²	3 0 3			
# ET C362	Environmental Pollution Control ²	3 0 3			
ET C411	Concepts of Engineering Design	3			
# ET C412	Production Planning & Control ¹	3 0 3			
ET C413	Advances in Materials Science	3 0 3			
# ET C414	Project Appraisal ¹	3 0 3			
ET C421	Computer Aided Project Planning and Monitoring	3			
ET C422	Computer Aided Manufacturing	3 0 3			
ET C431	Technology Forecasting	3 0 3			
ET C432	Quality Control, Assurance & Reliability	3 0 3			
ET C441	Technology Management	3 0 3			
ET C491	Special Projects	3			
Finance					
# FIN C312	International Financial Markets and Services ²	3 0 3			
# FIN C321	Theory of Finance ¹	3 0 3			
# FIN C322	Project Finance ²	3 0 3			
FIN C331	Management Accounting	3 0 3			
# FIN C332	Econometrics ²	3 0 3			

1 Compulsory Discipline Course normally offered in First Semester.

2 Compulsory Discipline Course normally offered in Second Semester.

# FIN C341	Investment Banking and Financial Services ¹	3 0 3	IS C415	Data Mining	3 0 3
# FIN C342	Financial Management ¹	3 0 3	IS C421	Modelling and Decision Systems	3 0 3
FIN C411	Project Appraisal	3 0 3	IS C422	Parallel Computing	3 0 3
FIN C413	Risk Management and Insurance	3 0 3	IS C424	Software for Embedded Systems	3 0 3
FIN C421	Financing International Trade	3 0 3	IS C431	Educational Software	1 4 3
FIN C422	Public Finance: Theory and Practice	3 0 3	IS C442	Advanced Algorithms and Complexity	3 0 3
FIN C424	Money Banking and Financial Markets	3 0 3	IS C444	Real Time Systems	3 0 3
FIN C431	Marketing	3 0 3	IS C446	Data Storage Technologies and Networks	3 0 3
FIN C432	Issues in Indian Economy	3 0 3	# IS C461	Computer Networks ²	3 0 3
FIN C433	Advertising & Sales Promotion	3 0 3	IS C462	Network Programming	3 0 3
FIN C436	Strategic Financial Management	3 0 3	IS C471	Computer Graphics	2 2 3
FIN C441	Organisational Behaviour	3 0 3	IS C472	Geographical Information Systems	3 0 3
FIN C442	Corporate Planning	3 0 3	IS C481	Graphical User Interfaces	3 0 3
FIN C451	International Business	3 0 3	Mathematics		
FIN C462	Services Marketing	3 0 3	# MATH C311	Algebra I ¹	3 0 3
FIN C491	Special Projects	3	# MATH C312	Algebra II ²	3 0 3
Information Systems			# MATH C321	Elementary Real Analysis ¹	3 0 3
IS C311	Computer Concepts and Software Systems	3 0 3	# MATH C322	Measure and Integration ²	3 0 3
# IS C313	Object Oriented Programming and Design ¹	3 2 4	# MATH C331	Introduction to Topology ¹	3 0 3
IS C314	Software Development for Portable Devices	2 2 3	# MATH C332	Introduction to Functional Analysis ²	3 0 3
IS C321	Program, Data & File Structures	3 0 3	# MATH C352	Differential Geometry ²	3 0 3
# IS C332	Database Systems and Applications ²	3 0 3	MATH C353	Statistical Inference and Applications	3 0 3
# IS C341	Software Engineering ²	3	MATH C411	Complex Analysis	3 0 3
# IS C342	Structures of Programming Languages ²	3 0 3	MATH C412	Concepts of Geometry	3 0 3
# IS C351	Computer Organization and Architecture ¹	3 2 4	MATH C413	Topological Groups	3 0 3
IS C352	Management Information Systems	3 0 3	MATH C421	Combinatorial Mathematics	3 0 3
# IS C362	Operating Systems ¹	3 0 3	MATH C422	Algebraic & Differential Topology	3 0 3
# IS C363	Data Structures and Algorithms ¹	3 2 4	MATH C431	Distribution Theory	3 0 3
IS C411	Information Systems Project	3	MATH C441	Discrete Mathematical Structures	3 0 3
			MATH C451	Ordinary Differential Equations	3 0 3
			MATH C452	Partial Differential Equations	3 0 3
			MATH C461	Integral Equations	3 0 3
			MATH C471	Non-Linear Optimisation	3 0 3

1 Compulsory Discipline Course normally offered in First Semester.

2 Compulsory Discipline Course normally offered in Second Semester.

MATH C481	Commutative Algebra	3 0 3	MF C481	Project Appraisal	3 0 3
MATH C491	Special Projects	3	MF C491	Special Projects	3

Manufacturing Engineering

# MF C312	Design of Machine Elements ¹	3 0 3
# MF C313	Kinematics and Dynamics of Machines ¹	3 0 3
# MF C314	Metal Forming and Machining ¹	3 2 4
# MF C315	Casting and Welding ²	3 2 4
# MF C316	Manufacturing Management ¹	3 0 3
MF C317	Instrumentation and Control	3 0 3
MF C318	Design of Machine Tools	3 0 3
# MF C319	Mechatronics and Automation ²	3 0 3
MF C321	Mechanical Engineering Drawing	3 0 3
MF C343	Maintenance and Safety	3 0 3
# MF C382	Computer Aided Design ²	3*
# MF C411	Tool and Fixture Design ²	3 0 3
MF C412	Automotive Systems	3 0 3
MF C413	Mechanical Vibrations and Acoustics	3 0 3
MF C414	Manufacturing Excellence	3 0 3
MF C415	Noise Engineering	3 0 3
MF C416	Work System Design	3 0 3
MF C417	Internal Combustion Engines	3 0 3
MF C418	Lean Manufacturing	3 0 3
MF C421	Supply Chain Management	4*
MF C432	Computer Aided Manufacturing	3 0 3
MF C441	Quality Control Assurance and Reliability	3 0 3
MF C442	Advances in Materials Science	3 0 3
MF C453	Industrial Relations	3 0 3
MF C472	Precision Engineering	3 0 3
MF C473	Product Design and Development	3 0 3
MF C474	Product Design and Development Projects	3

Mechanical Engineering

# ME C312	Design of Machine Elements ¹	3 0 3
# ME C314	Power Plant Engineering ²	3 0 3
# ME C331	Transport Phenomena II ¹	3 2 4
# ME C332	Prime Movers and Fluid Machines ²	3 2 4
# ME C342	Production Techniques ¹	3 2 4
# ME C382	Computer Aided Design ²	3
# ME C392	Advanced Mechanics of Solids & Kinematics ¹	3 0 3
ME C412	Production Planning & Control	3 0 3
# ME C422	Dynamics of Machines & Vibrations ²	3 0 3
ME C432	Computer Aided Manufacturing	3 0 3
ME C441	Automotive Vehicles	3 0 3
ME C442	Advances in Materials Science	3 0 3
ME C443	Quality Control, Assurance and Reliability	3 0 3
ME C451	Mechanical Equipment Design	3 0 3
ME C452	Composite Materials & Design	3 0 3
ME C461	Refrigeration and Airconditioning	3 0 3
ME C472	Precision Engineering	3 0 3
ME C481	Project Appraisal	3 0 3
ME C491	Special Projects	3

Pharmacy

# PHA C311	Natural Drugs ¹	2 3 3
# PHA C312	Forensic Pharmacy ²	3 0 3
# PHA C321	Anatomy Physiology & Hygiene ¹	2 3 3
# PHA C322	Dispensing Pharmacy ¹	2 3 3
# PHA C331	Industrial Pharmacy ¹	2 3 3
# PHA C332	Pharmacology and Toxicology ²	2 3 3
# PHA C342	Medicinal Chemistry ²	2 3 3

1 Compulsory Discipline Course normally offered in First Semester.

2 Compulsory Discipline Course normally offered in Second Semester.

PHA C411	Physical Pharmacy	2 3 3	PHY C461	Process Analysis Instrumentation	3 0 3
PHA C412	Veterinary Pharmacy	3 0 3	PHY C471	Astrophysics	3 0 3
PHA C413	Pharmaceutical Management & Quality Control	3 0 3	PHY C491	Special Projects	3
PHA C414	Biopharmaceutics	3 0 3	General Studies		
PHA C415	Pathophysiology	3 0 3	It should be noted that there is no clearly defined set of so-called discipline courses in respect of the General Studies programme. The courses drawn from those listed under Humanities, Social sciences and Other courses category and the Science and Applied Sciences category would meet such requirements.		
PHA C416	Chemistry of Synthetic Drugs	3 0 3	The M.Sc.(Tech.) General Studies programme has also flexibility to offer some skill oriented courses in two different streams, namely Communication and Media Studies and Development Studies. The pool of courses for the two proposed streams for M.Sc.(Tech.) General Studies programme have been identified as shown below:		
PHA C417	Pharmacoeconomics	3 0 3	Pool of Courses for Development Studies		
# PHA C421	Pharmaceutical Formulations and Biopharmaceutics ²	2 3 3	BITS C216	Selected Readings	3 0 3
PHA C422	Cosmetic Science	2 3 3	BITS C217	Environment, Development and Climate Change	3 0 3
PHA C431	Pharmacognosy	2 3 3	BITS C218	Public Policy	3 0 3
PHA C432	Hospital Pharmacy	3 0 3	BITS C319	Negotiation Skills and Techniques	2 0 2
PHA C441	Biochemical Engineering	3 0 3	BITS C320	Managerial Skills	2*
PHA C442	Applied Pharmaceutical Chemistry	3 0 3	BITS C385	Introduction to Gender Studies	3 0 3
PHA C461	Phytochemistry	2 3 3	BITS C393	Current Affairs	3 0 3
PHA C491	Special Projects	3	BITS C397	Techniques in Social Research	3 0 3
Physics			BITS C462	Renewable Energy	3 0 3
# PHY C311	Electromagnetic Theory I ¹	3 0 3	BITS C484	Introduction to Conflict Management	3 0 3
# PHY C312	Statistical Mechanics ²	3 0 3	BITS C487	Global Business Technology and Knowledge Sharing	3 0 3
# PHY C321	Quantum Mechanics I ¹	3 0 3	CDP C211	Agricultural Growth of India	3 0 3
# PHY C322	Solid State Physics ²	3 0 3	CDP C221	Growth of Social Health in India	3 0 3
* PHY C332	Methods of Mathematical Physics I ¹		CDP C371	Development Economics	3 0 3
* PHY C341	Nuclear Physics ²	3 0 3	ENGG C282	Industrial Engineering Techniques	3 0 3
* PHY C351	Methods of Experimental Physics	2 3 3			
* PHY C352	Atomic & Molecular Spectroscopy ²	3 0 3			
* PHY C353	Optical Physics & Applications	3 0 3			
* PHY C362	Particle Physics	3 0 3			
PHY C411	Electromagnetic Theory II	3 0 3			
PHY C421	Quantum Mechanics II	3 0 3			
PHY C422	Group Theory and Applications	3 0 3			
PHY C432	Laser and Applications	3 0 3			
PHY C441	Physics Laboratory	0 9 3			
PHY C451	Materials Science	3 0 3			

FIN C411	Project Appraisal	3 0 3
HUM C411	Professional Ethics	3 0 3
IS C472	Geographical Information Systems	3 0 3
MBA C413	Quantitative Methods	4
PHIL C221	Symbolic Logic	3 0 3
POL C212	Modern Political Concepts	3 0 3

Pool of Courses for Communication and Media Studies

BITS C214	Introduction to Mass Communication	3 0 3
BITS C216	Selected Readings	3 0 3
BITS C393	Current Affairs	3 0 3
BITS C394	Mass Media Content and Design	3 0 3
BITS C395	Short Film and Video Production	3 0 3
BITS C396	Reporting and Writing for Media	3 0 3
BITS C398	Creative Multimedia	2 2 3
BITS C486	Product and Brand Management	3 0 3
ENGL C261	Creative Writing	3
ENGL C342	Science Writings	3 0 3
HSS C313	Critical Analysis of Literature and Cinema	3 0 3
HSS C314	Print and Audio Visual Advertising	3 0 3
HUM C342	Graphic Art	3
HUM C411	Professional Ethics	3 0 3
HUM C422	Aesthetics	3 0 3
TA C231	Business Communication	3 0 3
TOC C215	Language Laboratory Practice	0 6 3

Depending on the interest of the students, Clause 1.08 Committee will replace some the existing courses in the chart of M. Sc. (Tech.) General studies with the courses from the concerned pool.

(xi) Practice School I & II or Thesis & Seminar

For each first degree programme, a student has to do Practice School I & II or Thesis & Seminar. Normally a dual degree student will do one degree with Practice School option and another degree with Thesis & Seminar option. Whenever permitted, both degrees may be done with Practice School option or with Thesis & Seminar option.

Note: In addition to the courses listed above there may be remedial course(s) designed by the Dean Instruction from time to time and reported to the Senate.

SEMESTERWISE PATTERNS FOR COMPOSITE DUAL DEGREE PROGRAMMES

The principle by which the composite programme is worked out is described below. All courses and categories of the two programmes that remain after excluding the elective categories, the PS component, the Thesis-Seminar (TS) component, constitute the basic requirement of the composite programme. On this basic requirement is superimposed the smaller of the two elective packages associated with the two concerned programmes as also PS and TS. All these courses are now properly interspersed and resequenced to form the dual degree programme. Thus normally in every dual degree scheme one degree would be with PS and the other with TS.

Semesterwise patterns for composite dual degree programme for Group B to Group A are given in the following pages. It may be seen from these patterns that the system is delicately balanced and any attempt to go outside this would not only upset the system but also result in an ambitious candidate spending more time than what the chart provides.

The semesterwise pattern for composite dual degree programme other than Group B to Group A will be worked out by the Senate appointed Committee as and when required.

**Composite Dual Degree Programme (Group B to Group A)
Input Entering in the First Semester
Group B to Engineering**

Year	First Semester	Second Semester
I	Same as First Degree Programme	Same as First Degree Programme
II	ES C241 Electrical Sciences I TA C211 Measurement Techniques I TA C252 Computer Programming II PHY C221 Modern Physics (for Phy) MATH C241 Mathematics III ECON C212 Principles of Economics (for Econ) MGTS C211 Principles of Management (for Math, Exptl. Sci.) BIO C211 Biochemistry (for Bio) SOC C211 Dynamics of Social Change (for Econ) ES C221 Mechanics of Solids (for Chem, Math, Phy) BIO C241 Microbiology (for Bio)	ES C242 Structure and Properties of Materials ES C272 Electrical Sciences II TA C222 Measurement Techniques II TA C312 Technical Report Writing CHEM C211 Atomic and Molecular Structure (for Chem) CHEM C232 Chemistry of Organic Compounds (for Chem) MGTS C211 Principles of Management (for Econ) CHE C221 Chemical Process Calculations (for Che) EEE C272 ECE C272 } Circuits & Signals (for EEE, ECE, EI) INSTR C272 ME C211 Applied Thermodynamics (for ME except Chem to ME and Econ to ME) MF C211 Applied Thermodynamics (for MF except Chem to MF and ECON to MF) MATH C222 Discrete Structures for Comp Sci (for CS) CE C212 Transport Phenomena I (for Civil except Chem to Civil) CE C241 Analysis of Structures (for Civil except Bio to Civil and Econ to Civil) ME C212 } Transport Phenomena I (for ME, MF) MF C212 } ES C263 Microprocessor Programming & Interfacing (for Bio to CS, Math to CS, Phy to CS) CHE C213 Fluid Flow Operations (for Che except Chem to Che and Econ to Che) ECON C211 Fundamentals of Finance & Accounting (for Econ)
Summer	BITS C221	Practice School I (for PS option only)
III	First Degree Compulsory Discipline Courses* AAOC C222 Optimization AAOC C311 Data Processing (for Econ. Math) AAOC C221 Graphs and Networks (for Math) BIO C391 Instrumental Methods of Analysis (for Bio) CHEM C391 Instrumental Methods of Analysis (for Chem) PHY C391 Instrumental Methods of Analysis (for Phy) PHY C212 Classical Mechanics (for Phy) ES C221 Mechanics of Solids (for Bio, Econ) Elective 1	First Degree Compulsory Discipline Courses* AAOC C312 Operations Research CE C212 Transport Phenomena I (for Chem to Civil) CE C241 Analysis of Structures (for Bio to Civil and Econ to Civil) ME C211 Applied Thermodynamics (for Chem to ME and Econ to ME) MF C211 Applied Thermodynamics (for Chem to MF and Econ to MF) CHE C213 Fluid Flow Operations (for Chem to Che and Econ to Che) ES C263 Microprocessor Programming & Interfacing (for Chem to CS, Econ to CS) Elective 1
IV	Second Degree Compulsory Discipline Courses* AAOC C321 Control Systems (for B to Che, EEE, EI) AAOC C341 Numerical Analysis (for B to Civil, ME, MF, CS) Electives 2	Second Degree Compulsory Discipline Courses* AAOC C341 Numerical Analysis (for B to Che, EEE, EI) AAOC C321 Control Systems (for B to Civil, ME, MF, CS) Electives 2
V	BITS C413 Practice School II OR BITS C421T Thesis BITS C441T Seminar	BITS C422T Thesis BITS C442T Seminar OR BITS C412 Practice School II

Note: Wherever First Degree Programme is mentioned above, it is as given in Pattern 1.

This is currently operative pattern for the students who have been admitted in 2010 or earlier as approved by the Senate-appointed committee, subject to change if the situation warrants.

* These are specialized discipline courses to be selected from a pool of courses. Their total number will range from six to nine. Details are given elsewhere in this Part.

**Composite Dual Degree Programme (Group B to Group A)
Input Entering in the First Semester**

Group B to Pharmacy

Year	First Semester	Second Semester
I	Same as First Degree Programme	Same as First Degree Programme
II	BIO C211 Biological Chemistry ECON C212 Principles of Economics ES C241 Electrical Sciences I PHY C221 Modern Physics (for Phy) MATH C241 Mathematics III TA C211 Measurement Techniques I TA C252 Computer Programming II BIO C241 Microbiology (for Bio) PHA C241 Microbiology (for Chem, Econ, Math, Phy)	ES C242 Structure and Properties of Materials ES C272 Electrical Sciences II CHEM C232 Chemistry of Organic Compounds (for Bio, Chem, Math, Phy) MGTS C211 Principles of Management TA C222 Measurement Techniques II TA C312 Technical Report Writing CHEM C211 Atomic & Molecular Structure (for Chem) SOC C211 Dynamics of Social Change (for Econ) PHA C212 Pharmaceutical Analysis (for Bio, Phy) ECON C211 Fundamentals of Finance & Accounting (for Econ) AAOC C311 Data Processing (for Math)
Summer	BITS C221 Practice School I (for PS option only)	
III	First Degree Compulsory Discipline Courses* AAOC C222 Optimization AAOC C311 Data Processing (for Econ. Math) AAOC C221 Graphs and Networks (for Math) PHY C212 Classical Mechanics (for Phy) PHA C391 Instrumental Methods of Analysis Elective 1	First Degree Compulsory Discipline Courses* AAOC C312 Operation Research AAOC C341 Numerical Analysis (for Math. Exptl.Sc.) PHA C212 Pharmaceutical Analysis (for CHEM, Math, Econ) CHEM C232 Chemistry of Organic Compounds (for Econ)
IV	Second Degree Compulsory Discipline Courses* Electives 3	Second Degree Compulsory Discipline Courses* Electives 2
V	BITS C413 Practice School II OR BITS C421T Thesis BITS C441T Seminar	BITS C422T Thesis BITS C442T Seminar OR BITS C412 Practice School II

Note: Wherever First Degree Programme is mentioned above, it is as given in Pattern 1.

This is currently operative pattern for the students who have been admitted in 2010 or earlier as approved by the Senate-appointed committee, subject to change if the situation warrants.

* These are specialized discipline courses to be selected from a pool of courses. Their total number will range from six to nine. Details are given elsewhere in this Part.

**Composite Dual Degree Programme (Group B to Group A)
Input Entering in the Second Semester**

Group B to Engineering

Year	First Semester	Second Semester
I		Same as First Degree Programme
II	Same as First Degree Programme	Same as First Degree Programme
III	Same as First Degree Programme	ECON C211 Fundamentals of Finance & Accounting (for Econ) AAOC C312 Operations Research ES C272 Electrical Sciences II TA C222 Measurement Techniques II CE C212 Transport Phenomena I (for Civil) CE C241 Analysis of Structures (for Civil) ME C212 Transport Phenomena I (for ME) CHE C213 Fluid Flow Operations (for Che) CHE C221 Chemical Process Calculations (for Che) EEE C272 Circuits & signals (for EEE) INSTR C272 Circuits & Signals (for EI) MATH C222 Discrete Structures for Com. Sci. (for CS) ME C211 Applied Thermodynamics (for ME) MF C211 Applied Thermodynamics (for MF) MF C212 Transport Phenomena I (for MF) ES C263 Microprocessor Programming & I Interfacing (for CS, EEE, EI) CHEM C232 Chemistry of Organic Compounds (for Chem) CHEM C211 Atomic & Molecular Structure (for Chem)
Summer		BITS C221 Practice School I (for PS Option only)
IV	First Degree Compulsory Discipline Courses* ES C221 Mechanics of Solids AAOC C311 Data Processing for (for Econ. , Math) AAOC C221 Graphs and Networks (for Math) BIO C391 Instrumental Methods of Analysis (for Bio.) CHEM C391 Instrumental Methods of Analysis (for Chem.) PHY C391 Instrumental Methods of Analysis (for Phy.) PHY C212 Classical Mechanics (for Phy)	First Degree Compulsory Discipline Courses* AAOC C341 Numerical Analysis (for Math, Exptl. Sc.) Electives 2
V	Second Degree Compulsory Discipline Courses* AAOC C321 Control Systems Electives 2	Second Degree Compulsory Discipline Courses* Electives 2
VI	BITS C413 Practice School II OR BITS C421T Thesis BITS C441T Seminar	BITS C422T Thesis BITS C442T Seminar OR BITS C412 Practice School II

Note: Wherever First Degree Programme is mentioned above, it is as given in Pattern 1.

This is currently operative pattern for the students who have been admitted in 2010 or earlier as approved by the Senate-appointed committee, subject to change if the situation warrants.

* These are specialized discipline courses to be selected from a pool of courses. Their total number will range from six to nine. Details are given elsewhere in this Part.

**Composite Dual Degree Programme (Group B to Group A)
Input Entering in the Second Semester**

Group B to Pharmacy

Year	First Semester	Second Semester
I		Same as First Degree Programme
II	Same as First Degree Programme	Same as First Degree Programme
III	AAOC C222 Optimisaton ES C241 Electrical Sciences I TA C211 Measurement Techniques I BIO C241 Microbiology (for Bio) PHA C241 Microbiology (for Chem, Econ, Math, Phy) PHY C221 Modern Physics (for Phy) BIO C211 Biological Chemistry ECON C212 Principles of Economics	AAOC C312 Operations Research ES C272 Electrical Sciences II TA C222 Measurement Techniques II CHEM C232 Chemistry of Organic Compounds (for Bio) CHEM C211 Atomic & Molecular Structure (for Chem) ECON C211 Fundamentals of Finance & Accounting (for Econ) PHA C212 Pharmaceutical Analysis SOC C211 Dynamics of Social Change (for Econ.) Elective 1
Summer	BITS C221 Practice School I (for PS Option Only)	
IV	First Degree Compulsory Discipline Courses* AAOC C221 Graphs and Networks (for Math) AAOC C311 Data processing (for Econ., Math) PHA C391 Instrumental Methods of Analysis PHY C212 Classical Mechanics (for Phy)	First Degree Compulsory Discipline Courses* AAOC C341 Numerical Analysis (for Math, Exptl. Sc.) CHEM C232 Chemistry of Organic Compounds (for Chem, Econ, Math, Phy) Elective 1
V	Second Degree Compulsory Discipline Courses* Electives 2	Second Degree Compulsory Discipline Courses* Electives 2
VI	BITS C413 Practice School II OR BITS C421T Thesis BITS C441T Seminar	BITS C422T Thesis BITS C442T Seminar OR BITS C412 Practice School II

Note: Wherever First Degree Programme is mentioned above, it is as given in Pattern 1.

This is currently operative pattern for the students who have been admitted in 2010 or earlier as approved by the Senate-appointed committee, subject to change if the situation warrants.

* These are specialized discipline courses to be selected from a pool of courses. Their total number will range from six to nine. Details are given elsewhere in this Part.

(II) Structure of the Integrated First Degree Programmes of students admitted 2011 onwards

The structure and the requirements of the first degree programs, namely, B.E. (Hons), B. Pharm (Hons), M.Sc. (Hons), M.Sc.(Tech) are as per following details:

1. The category-wise structure of each program:

Category	Number of Units Required	Number of Courses Required
(I) General Institutional Requirement		
Humanities Electives	8	3
Science Foundation	12	6
Mathematics Foundation	12	4
Engineering Foundation	6	2
Technical Arts	10	4
General Awareness / Professional Courses	3 to 6	1 to 3
Sub-Total	51 to 54	20 to 22
(II) Discipline Requirement		
Core	33 to 48	10 to 16
Elective	12 to 27	4 to 9
Sub-Total	57 to 60	15 to 20
(III) Open Electives	15 to 27	5 to 9
Course-work Sub-Total	126 (min)	40 (min)
(IV) PS-I and II	25	2
OR	OR	OR
Thesis	9 to 16	1
Total	141 (min)	41 (min)

2. The following courses are needed to meet the General Institutional Requirement:

- a) General Biology, Biology Laboratory, General Chemistry, Chemistry Laboratory, Mechanics, Oscillations and Waves, and Physics Laboratory under the head of Science Foundation.
- b) Electrical Sciences and Thermodynamics under the head of Engineering Foundation.
- c) Computer Programming, Workshop Practice, Engineering Graphics, and

Technical Report Writing under the head of Technical Arts.

- d) Principles of Economics and Principles of Management under the head of General Awareness / Professional courses.
3. The courses under the following heads are designed to meet the General Institutional Requirement under the head of Humanities Electives:
- o Languages and Literature
 - o History and Philosophy
 - o Political and Social Sciences
 - o Fine Arts and Professional Arts
4. The nominal semester-wise chart for a first degree program is given in the Page IV-28.

Dual Degree Programs:

Based on the above, the structure of a dual degree program has been derived using the following principles.

- o General Institute Requirements will remain the same for both the degrees of the composite dual-degree program and therefore need not be repeated.
- o While the Discipline Requirements of each of the two degrees in a dual degree program have to be met separately, any course that meets the discipline requirements of both the degree programs need not be repeated.
- o In addition the Discipline Elective courses of either of the two degrees in a dual degree program may be used to fulfill the open elective requirement of the other degree.
- o A PS-II or Thesis must be done to meet the requirements of each degree. Therefore to complete the dual degree program a student must complete one of the following:
 - 2 PS-II courses
 - 2 Thesis courses
 - 1 PS-II course and 1 Thesis course.

Based on these principles, the semester-wise patterns for a composite dual degree program as options for the student are shown in pages IV-29, IV-30 and IV-31. More details will be made available to the admitted students in due course of time.

Semester-wise Pattern for Students admitted to First Degree Programmes						
Year	First Semester		U	Second Semester		U
I	BIO F110	Biology Laboratory	1	MATH F112	Mathematics II	3
	BIO F111	General Biology	3	ME F110	Workshop Practice	2
	CHEM F 110	Chemistry Laboratory	1	CS F111	Computer Programming	4
	CHEM F111	General Chemistry	3	EEE F111	Electrical Sciences	3
	MATH F111	Mathematics I	3	BITS F112	Technical Report Writing	2
	PHY F110	Physics Laboratory	1	MATH F113	Probability and Statistics	3
	PHY F111	Mechanics, Oscillations and Waves	3	BITS F111	Thermodynamics	3
	BITS F110	Engineering Graphics	2			
			17			20
II	MATH F211	Mathematics III	3	ECON F211	Principles of Economics OR	3
		Discipline Core Courses	12to15	MGTS F211	Principles of Management Discipline Core Courses	12to15
		Open /Humanities Electives	3		Open/Humanities Electives	3
			18/21			18/21
Summer BITS C221 Practice School - I (for PS Option Only)						
III	Discipline Courses – Core/Elective		15to18	Discipline Courses – Core/elective		15to18
	Open/ Humanities Electives		0 to6	Open/Humanities Electives		0to6
			18/21			18/21
IV	Electives		5 to 17	PS-II(20) or Thesis (16) or Thesis (9) AND Electives (6 to 9)		20 or 16 or 6to9
			5/17			

Note: This is operative pattern for the students who are admitted from August 2011 onwards as approved by the Senate-appointed committee, subject to change if the situation warrants. Details of discipline specific courses and electives will be announced in due course of time.

Pattern 1 Semester-wise Pattern for Composite Dual Degree Programmes (Option A: Duration 10 Sem.)								
Year	First Semester			U	Second Semester			U
I	BIO	F110	Biology laboratory	1	MATH	F112	Mathematics II	3
	BIO	F111	General Biology	3	ME	F110	Workshop Practice	2
	CHEM	F110	Chemistry Laboratory	1	CS	F111	Computer Programming	4
	CHEM	F111	General Chemistry	3	EEE	F111	Electrical Sciences	3
	MATH	F111	Mathematics I	3	BITS	F112	Technical Report Writing	2
	PHY	F110	Physics Laboratory	1	MATH	F113	Probability and Statistics	3
	PHY	F111	Mechanics, Oscillations and Waves	3	BITS	F111	Thermodynamics	3
	BITS	F110	Engineering Graphics	2				
			17				20	
II	MATH	F211	Mathematics III	3	ECON	F211	Principles of Economics OR	3
			First Discipline Core Courses Electives	13 to17 3 to6 23/24	MGTS	F211	Principles of Management First Discipline Core Courses Electives	13to17 3to6 23/24
Summer BITS C221 Practice School - I (for PS Option Only)								
III			Second Discipline Core courses First Discipline Courses - Core/Elective	12to16 7to11 23/24			Second Discipline Core Courses First Discipline Courses – Core / Elective	12to16 7to11 23/24
IV			First Discipline Elective Courses Second Discipline Courses – Core + Elective	3to10 14to18 23/24			First Discipline Elective Courses Second Discipline Courses - Core + Elective Electives (0 to 6)	3to10 14to18 0to6 23/24
V			Electives Thesis	5to9 9			PS-II or Thesis	20 or 16

Note: This is operative pattern for the students who are admitted from August 2011 onwards as approved by the Senate-appointed committee, subject to change if the situation warrants. Details of discipline specific courses and electives will be announced in due course of time.

Pattern 2 Semester-wise Pattern for Composite Dual Degree Programmes							
(Option B: Duration 10 Sem. and a Summer Term)							
Year	First Semester			U	Second Semester		U
I	BIO	F110	Biology laboratory	1	MATH F112	Mathematics II	3
	BIO	F111	General Biology	3	ME F110	Workshop Practice	2
	CHEM	F110	Chemistry Laboratory	1	CS F111	Computer Programming	4
	CHEM	F111	General Chemistry	3	EEE F111	Electrical Sciences	3
	MATH	F111	Mathematics I	3	BITS F112	Technical Report Writing	2
	PHY	F110	Physics Laboratory	1	MATH F113	Probability and Statistics	3
	PHY	F111	Mechanics, Oscillations and Waves	3	BITS F111	Thermodynamics	4
	BITS	F110	Engineering Graphics(2)	2			
				17			20
II	MATH F211	Mathematics III		3	ECON F211	Principles of Economics	
		First Discipline Core Courses		13to17	OR		3
		Electives		3to6	MGTS F211	Principles of Management	13to17
				23/24	First Discipline Core Courses	3to6	23/24
					Electives		
Summer BITS C221 Practice School - I (for PS Option Only)							
III	Second Discipline Core Courses			12to16	Second Discipline Core Courses		12to16
	First Discipline Courses – Core / Elective			7to11	First Discipline Courses – Core / Elective		7to11
				23/24			23/24
IV	First Discipline Elective Courses			3/10	First Discipline Elective Courses		3to10
	Second Discipline Courses – Core + Elective			14to18	Second Discipline Courses – Core + Elective		14to18
				0to6	Electives		0to6
				23/24			23/24
Summer	Electives			5/9			
V	PS - II			20	PS - II		20
	or			or	or		or
	Thesis			16	Thesis		16

Note: This is operative pattern for the students who are admitted from August 2011 onwards as approved by the Senate-appointed committee, subject to change if the situation warrants. Details of discipline specific courses and electives will be announced in due course of time.

Pattern 3 Semesterwise Pattern for Dual Degree (Duration 11 Sem.)							
Year	First Semester			U	Second Semester		U
I	BIO	F110	Biology laboratory	1	MATH F112	Mathematics II	3
	BIO	F111	General Biology	3	ME F110	Workshop Practice	2
	CHEM	F110	Chemistry Laboratory	1	CS F111	Computer Programming	4
	CHEM	F111	General Chemistry	3	EEE F111	Electrical Sciences	3
	MATH	F111	Mathematics I	3	BITS F112	Technical Report Writing	2
	PHY	F110	Physics Laboratory	1	MATH F113	Probability and Statistics	3
	PHY	F111	Mechanics, Oscillations and Waves	3	BITS F111	Thermodynamics	3
	BITS	F110	Engineering Graphics	2			
				17			20
II	MATH	F211	Mathematics III	3	ECON F211	Principles of Economics	1'3
			First Discipline Core Courses		OR		
			Electives	3to6	MGTS F211	Principles of Management	13to17
			21/22		First Discipline Core Courses	3to6	
					Electives	21/22	
Summer BITS C221 Practice School - I (for PS Option Only)							
III	Second Discipline Core courses			12to16	Second Discipline Core Courses		12to16
	First Discipline Courses - Core/Elective			7to10	First Discipline Courses – Core / Elective		7to11
				21/22			21/22
IV	First Discipline Elective Courses			3to10	First Discipline Elective Courses		3to10
	Second Discipline Courses – Core+Elective			14to18	Second Discipline Courses - Core + Elective		14to18
	Electives			0to6	Electives		0to6
				21/22			21/22
V	Electives			17to23	PS-II or Thesis		20 or 16
VI	PS-II or Thesis			20 or 16			

Note: This is operative pattern for the students who are admitted from August 2011 onwards as approved by the Senate-appointed committee, subject to change if the situation warrants. Details of discipline specific courses and electives will be announced in due course of time.

HIGHER DEGREE PROGRAMMES

A. Requirements

(i) M. E. and M. Pharm:

The following structure and requirements are:

- (a) (a) at least 12 courses and at least 48 credit units attributed to coursework; and
- (b) In addition, a Practice School (of at least 5½ months duration and 20 units) or a Dissertation (of at least 1 semester duration and 16 credit units)

2. A 4 unit course on Research Practice is mandatory for all students

- o BITS G540 Research Practice

3. Each Department may stipulate - for each program a set of 4 to 5 courses (of at least 16 units and at most 20 units) per semester.

- (a) This adds up to at least 12 courses and at least 48 units of coursework but with a maximum of 15 courses and at most 60 units of coursework stipulated by the Department.

(b) The nominal chart for a program would be as follows:

Year	I Semester	II Semester
I year	4 to 5 courses (16 to 20 units)	4 to 5 courses (16 to 20 units)
II year	4 to 5 courses (16 to 20 units)	PS / Dissertation

4. Each Department may identify one-third (1/3) to one-half (1/2) of the coursework requirement for each program as the Core Requirement.

(a) The Core Requirement is mandatory for all students in the program.

(b) The Core Requirement will be common across all campuses of BITS offering the same program.

5. Rest of the coursework requirement – other than the Core Requirement and the Research Practice course – may be met by electives of each student's choice.

(a) The student must choose such electives from a Pool of Electives listed for the specific program.

(b) The Pool of Electives may vary from campus to campus.

6. Each course in the Core Requirement or in the List of Electives must be a graduate level (5th or 6th level) course or an advanced under-graduate course (4th level) with the restriction that a student may use at the most two 4th level courses to meet the requirements in above.

7. Each Department in each campus may decide the scheduling of Core / Elective courses as per the above chart as deemed fit.

8. A student may choose to overload his/her coursework by at most one course – carrying not more than 5 units - per semester:

(a) Such courses may be chosen from one of the following

(i) the pool of courses listed as Electives for the program being pursued

(ii) a general pool of courses listed as Graduate Level Electives available for all higher degree programs

(iii) any other course under the conditions that the stipulated pre-requisites are met and that the Head of the Department of the student and Head of the Department offering the course both provide their consent

(b) Such courses may not be counted towards the requirement stated in 1.(a) above.

9. A student who wants to pursue Dissertation may choose between doing the Dissertation on campus and doing the Dissertation in an external industrial / research organization. The Department must identify such locations/ organizations as suitable for a student pursuing Dissertation in that discipline. If a student exercises the option of doing his/her Dissertation in an organization other than BITS, then the Department must identify a co-supervisor for the student from within the Department.

10. The Dissertation will carry 16 credit units for the nominal duration of 1 semester.
- During this semester a student may not be permitted to do coursework.
 - A student –with the consent of the Department - may extend the duration of the Dissertation over two semesters while concurrently doing coursework during the semester.
 - If the student exercises option (b) then the total weight of the Dissertation will not exceed 25 credit units.
11. In addition to the above courses, the higher degree students will be required to register in the following course, unless the student clears a diagnostic test specially designed for the same.
- o BITS C437 Technical Communication 3 0 3

(ii) MPH:

Total number of units required – 60 (Minimum) with a breakup as follows:

- Dissertation: 15 (Min) – 25 (Max) Units
OR
Practice School : 20 units
- Course work : 35 (Min) units
(other than Dissertation/Practice School)

Courses for the course work will be chosen from the list of Core and elective courses earmarked for each degree. Total number of courses is nine. In addition to these nine courses all the students are required to do one course on Technical Communication and two courses on Professional Practice. For electives, courses can be drawn from across various disciplines, subject to approval by the Higher Degree Counselling Committee (HDCC).

There is also a flexibility for students of Higher Degree Programmes to register in upto a maximum of one more elective, in addition to the prescribed number of electives. The grade obtained in the additional elective will also be counted towards the CGPA. This additional elective can be from the pool of electives of the concerned degree or courses from other

disciplines' Core and electives with the permission of HDCC.

(iii) M.Phil.:

Total number of units required - 50 (Minimum) with a breakup as follows:

- Dissertation : 12 (Min.) - 25 (Max.) units
OR
Practice School : 20 units
- Course work : 25 units (min.)
(other than Dissertation/Practice School)

The courses for course work can be chosen from a list of General/Special courses earmarked for the degree. Wherever there is a need, courses can also be drawn from across the course offerings in various Higher Degree programmes as well as advanced First Degree level, provided the students are adequately prepared for the particular course.

(iv) M.B.A.: The course requirements of the MBA programme are spelt out in terms of courses belonging to different categories in the table below:

Category	No. of Units Required	No. of Courses Required
Core Courses	40-60	15-20
Elective(s)	12-18	4-6
Subtotal	55 (Min)	20 (Min)
PS OR Dissertation	20 16	1
Total	70 (Min)	21 (Min)

Courses for the course work will be chosen from the list of Core and elective courses earmarked for the MBA degree.

Dissertation: Normal registration for dissertation is after completion of course work. Normally 16 units of Dissertation will be assigned at the time of this registration. In case of programmes other than MBA, units upto a maximum of 25 may be

permitted depending on the total time and work put in by an individual student and the registration in more than 16 units of Dissertation will be normally available only to students who have taken higher degree courses as electives in their first degree programmes or to professionals who have shown competence in some specialized courses through their professional involvement. Concurrent registration for a nominal 8 units per semester in Dissertation with course work is also permissible for motivated, well-prepared and hardworking students. Provision exists for the Dissertation to be carried out as work-integrated dissertation at recognized off-campus centres or in an organization where the student may get employment, subject to all the stipulations of Academic Regulations.

Practice School: Registration for Practice School is possible only after the completion of all course work. Concurrent registration of other courses with Practice School is not permitted. All clauses of Academic Regulations applicable to first degree PS courses will govern the operation of this Practice School also.

B. Access to Courses

This access is subject to the Academic Regulations and further specific stipulations as follows:

- All general/special courses require the corresponding first degree of BITS or equivalent.
- Approval of the Higher Degree Counselling Committee.

C. General

- (i) There will be a Higher Degree Counselling Committee composed of Dean RCD (Convenor), Dean ARCD, Dean ID, Dean PSD, Dean WILPD and the Unit Chief IPC.

This Committee is charged with the task of making the semesterwise programmes for various students and monitoring the same.

The Committee may co-opt any faculty member of the Institute whenever there is a need to discuss an individual case.

This Committee will also draw, from time to time, a list of courses from the Higher Degree programmes from which the students of the Integrated First Degrees can offer the courses as their electives.

- (ii) The Dissertation, whether registered for full or partial units, will be awarded a non-letter grade, viz., Excellent, Good, Fair or Poor, at the end of the corresponding semester.
- (iii) Ph.D. Qualifying Examination for an eligible candidate will be based on the higher degree courses. Dissertation will not form part of the Qualifying Examination.
- (iv) A first degree student can choose upto a maximum of two higher degree courses as electives for his/her first degree from the pool of general/special courses of the corresponding higher degree. When such a student seeks admission to any of the Higher Degree programme of the institute, the student may be given exemption from these courses; however, the student will have to complete the total unit requirements of the higher degree. The minimum units in Dissertation for such a candidate will be increased by the same number of units as exempted from the course work so as to earn the minimum prescribed total units. In such a case, the exempted courses will also form part of the Ph.D. Qualifying Examination when the student appears for the same. HDCC is also empowered to replace the course cleared in first degree by a course from the pool of electives of higher degree on a case by case basis, as an alternative to increasing the dissertation units.

Pattern 1 Semesterwise Pattern for Students Admitted to Higher Degree Programmes in the First Semester								
Year	First Semester			U	Second Semester			U
M.E. Biotechnology								
I	BIO	G512	Molecular Mechanism of Gene Expression	5	BITS	G540	Research Practice	4
	BIO	G542	Advanced Cell and Molecular Biology	5	BIO	G524	Animal Cell Technology	5
	BIO	G525	Environmental Biotechnology and Waste Management Elective	5	BIO	G643	Plant Biotechnology Elective	5
				*				*
				18				20
II	BIO	G523	Advanced and Applied Microbiology	5	BITS	G629T	Dissertation	16
			Elective	*			or	20
			Elective	*	BITS	G639	Practice School	
			Elective	*				
				17				16/20
M.E. Chemical								
I	CHE	G613	Advanced Mass Transfer	5	BITS	G540	Research Practice	4
	CHE	G614	Advanced Heat Transfer	5	CHE	G523	Mathematical Methods in Chemical Engineering	5
	CHE	G622	Advanced Chemical Engineering Thermodynamics	5	CHE	G641	Reaction Engineering	5
			Elective	*			Elective	*
				18				20
II			Elective	*	BITS	G629T	Dissertation	16
			Elective	*			or	20
			Elective	*	BITS	G639	Practice School	
			Elective	*				
				12				16/20
M.E. Chemical – Petroleum Engineering								
I	CHE	G616	Petroleum Reservoir Engineering	5	BITS	G540	Research Practice	4
	CHE	G617	Petroleum Refinery Engineering	5	CHE	G523	Mathematical Methods in Chemical Engineering	5
	CHE	G622	Advanced Chemical Engineering Thermodynamics	5	CHE	G618	Petroleum Downstream Processing	5
			Elective	*	CHE	G641	Reaction Engineering	5
				18		Elective	*	22
II			Elective	*	BITS	G629T	Dissertation	16
			Elective	*			or	20
			Elective	*	BITS	G639	Practice School	
			Elective	*				
				12				16/20

* Minimum 3 Units

Note: This is the suggested semesterwise pattern by the appropriate Senate appointed committee, subject to change if the situation warrants.

Pattern 1 Semesterwise Pattern for Students Admitted to Higher Degree Programmes in the First Semester										
Year	First Semester				U	Second Semester				U
M.E. Civil – Infrastructure Systems										
I	CE	G515	Fundamentals of Systems Engineering	4	BITS	G540	Research Practice		4	
	CE	G523	Transportation Systems Planning and Management	4	CE	G520	Infrastructure Planning and Management		4	
	CE	G525	Water Resources Planning and Management	4			Elective		*	
	CE	G619	Finite Element Analysis	5			Elective		*	
				17					14	
II			Elective	*	BITS	G629T	Dissertation		16	
			Elective	*			or			
			Elective	*	BITS	G639	Practice School		20	
			Elective	*						
				12					16/20	
M.E. Civil – Structural Engineering										
I	CE	G551	Dynamics of Structures	4	BITS	G540	Research Practice		4	
	CE	G552	Advanced Structural Mechanics and Stability	4	CE	G615	Earthquake Engineering		4	
	CE	G617	Advanced Structural Analysis	4			Elective		*	
	CE	G619	Finite Element Analysis	5			Elective		*	
				17					14	
II			Elective	*	BITS	G629T	Dissertation		16	
			Elective	*			or			
			Elective	*	BITS	G639	Practice School		20	
			Elective	*						
				12					16/20	
M.E. Civil – Transportation Engineering										
I	CE	G523	Transportation Systems Planning and Management	4	BITS	G540	Research Practice		4	
	CE	G534	Pavement Material Characterization	4	CE	G518	Pavement Analysis and Design		4	
	CE	G535	Highway Geometric Design	4	CE	G524	Urban Mass Transit Planning Operations and Management		4	
	CE	G536	Traffic Engineering and Safety	4			Elective		*	
				16					15	
II			Elective	*	BITS	G629T	Dissertation		16	
			Elective	*			or			
			Elective	*	BITS	G639	Practice School		20	
			Elective	*						
				12					16/20	
M.E. Civil – Water Resource Engineering										
I	CE	G526	Systems Approach to Water Resources Modeling	4	BITS	G540	Research Practice		4	
	CE	G555	Remote Sensing and GIS in Water Resources	4	CE	G558	Advanced Groundwater Hydrology		4	
	CE	G556	Advanced Computational Hydraulics	4	CE	G559	Soft Computing in Water Resources		4	
	CE	G557	Stochastic Hydrology	4			Elective		*	
				16					15	
II			Elective	*	BITS	G629T	Dissertation		16	
			Elective	*			or			
			Elective	*	BITS	G639	Practice School		20	
			Elective	*						
				16					16/20	

Pattern 1 Semesterwise Pattern for Students Admitted to Higher Degree Programmes in the First Semester										
Year	First Semester				U	Second Semester				U
M.E. Communication Engineering										
	EEE	C415	Digital Signal Processing	4	BITS	G540	Research Practice		4	
	EEE	G581	RF and Microwave Engineering	5	EEE	G592	Mobile and Personal			
	EEE	G612	Coding Theory and Practice	5			Communication		5	
			Elective	*	EEE	G622	Advanced Digital Communication		5	
							Elective		*	
				17					17	
	EEE	G591	Optical Communication	5	BITS	G629T	Dissertation		16	
			Elective	*			or			
			Elective	*	BITS	G639	Practice School		20	
			Elective	*						
				14					16/20	
M.E. Computer Science										
	CS	G525	Advanced Computer Networks	5	BITS	G540	Research Practice		4	
	CS	G526	Advanced Algorithms and Complexity	5	CS	G513	Network Security		4	
					CS	G524	Advanced Computer Architecture		5	
I		C623	Advanced Operating Systems	5			Elective		*	
			Elective	*						
				18					16	
			Elective	*	BITS	G629T	Dissertation		16	
			Elective	*			or			
II			Elective	*	BITS	G639	Practice School		20	
			Elective	*						
				12					16/20	
M.E. Electrical – Power Electronics and Drives										
	EEE	G542	Power Electronics Converter	5	BITS	G540	Research Practice		4	
	EEE	G541	Distribution Apparatus and Configuration	5	EEE	G545	Control and Instrumentation Systems		5	
I		G543	Power Devices microelectronics and selection	5	EEE	G552	Solid State Drives		5	
			Elective	*			Elective		*	
				18					17	
	EEE	G546	System Simulation	5	BITS	G629T	Dissertation		16	
			Elective	*			or			
II			Elective	*	BITS	G639	Practice School		20	
			Elective	*						
				14					16/20	
M.E. Embedded Systems										
	BITS	G553	Real Time Systems	5	BITS	G540	Research Practice		4	
	EEE	G512	Embedded System Design	4	CS	G523	Software for Embedded Systems		5	
I			Elective	*	MEL	G642	VLSI Architecture		5	
			Elective	*			Elective		*	
				17					18	
	EEE	G626	Hardware Software Co-Design	5	BITS	G629T	Dissertation		16	
			Elective	*			or			
II			Elective	*	BITS	G639	Practice School		20	
			Elective	*						
				17					16/20	

* Minimum 3 Units

Note: This is the suggested semesterwise pattern by the appropriate Senate appointed committee, subject to change if the situation warrants.

Pattern 1 Semesterwise Pattern for Students Admitted to Higher Degree Programmes in the First Semester								
Year	First Semester			U	Second Semester			U
M.E. Microelectronics								
I	MEL G611	IC Fabrication Technology	5	BITS G540	Research Practice		4	
	MEL G621	VLSI Design	5	MEL G632	Analog IC Design		5	
	MEL G631	Physics & Modeling of Microelectronic Devices	5	MEL G642	CAD for IC Design		*	
		Elective	*		Elective		*	
			19				18	
II		Elective	*	BITS G629T	Dissertation		16	
		Elective	*		or		or	
		Elective	*	BITS G639	Practice School		20	
		Elective	*					
			13				16/20	
M.E. Manufacturing Systems Engineering								
I	EA C412	Flexible Manufacturing Systems	4	BITS G540	Research Practice		4	
	ME C443	Quality Control Assurance and Reliability	3	MSE G512	Manufacturing Planning and Control		5	
	ME G511	Mechanism and Robotics	5		Elective		*	
		Elective	*		Elective		*	
			15				15	
II	MSE G521	World Class Manufacturing	5	BITS G629T	Dissertation		16	
	ITEB G621	Supply Chain Management	4		or		or	
		Elective	*	BITS G639	Practice School		20	
		Elective	*					
			15				16/20	
M.E. Mechanical Engineering								
I	ME C443	Quality Control Assurance and Reliability	3	BITS G540	Research Practice		4	
	ME G511	Mechanism and Robotics	5	ME G611	Computer Aided Analysis and Design		5	
	ME G512	Finite Element Methods	5		Elective		*	
		Elective	*		Elective		*	
			16				15	
II	ME G532	Machine Tool Engineering	5	BITS G629T	Dissertation		16	
	ME G641	Theory of Elasticity and Plasticity	5		or		or	
		Elective	*	BITS G639	Practice School		20	
		Elective	*					
			16				16/20	
M.E. Design Engineering								
I	DE G631	Materials Testing and Technology	5	BITS G540	Research Practice		4	
	ME G511	Mechanism and Robotics	5	ME G611	Computer Aided Analysis and Design		5	
	ME G512	Finite Element Methods	5		Elective		*	
		Elective	*		Elective		*	
			18				15	
II	DE G531	Product Design	5	BITS G629T	Dissertation		16	
	DE G611	Dynamics and Vibration	5		or		or	
		Elective	*	BITS G639	Practice School		20	
		Elective	*					
			16				16/20	

* Minimum 3 Units

Note: This is the suggested semesterwise pattern by the appropriate Senate appointed committee, subject to change if the situation warrants.

Pattern 1 Semesterwise Pattern for Students Admitted to Higher Degree Programmes in the First Semester							
Year	First Semester			U	Second Semester		U
M.E. Thermal Engineering							
I	BITS C462	Renewable Energy	3	BITS G540	Research Practice	4	
	ME G533	Conduction and Radiation Heat Transfer	5	ME G535	Convective Heat and Mass Transfer	5	
	ME G621	Fluid Dynamics	5		Elective	*	
		Elective	*		Elective	*	
			16			15	
II	ME G514	Turbomachinery	5	BITS G629T	Dissertation	16	
	ME G515	Computational Fluid Dynamics	5		or	or	
		Elective	*	BITS G639	Practice School	20	
		Elective	*				
			16			16/20	
M. Pharma. Pharmacy							
I	PHA G532	Quality Assurance and Regulatory Affairs	5	BITS G540	Research Practice	4	
	PHA G543	Clinical Research	5	PHA G611	Advanced Pharmacology	5	
	PHA G612	Pharmacokinetics and Clinical Pharmacy	5	PHA G621	Advanced Medicinal Chemistry	5	
		Elective	*	PHA G632	Dosage Form Design	5	
			18			19	
II		Elective	*	BITS G629T	Dissertation	16	
		Elective	*		or	or	
		Elective	*	BITS G639	Practice School	20	
		Elective	*				
			12			16/20	
M. Pharma. Pharmacy – Pharmaceutics							
I	PHA G532	Quality Assurance and Regulatory Affairs	5	BITS G540	Research Practice	4	
	PHA G543	Clinical Research	5	PHA G632	Dosage Form Design	5	
	PHA G612	Pharmacokinetics and Clinical Pharmacy	5		Elective	*	
	PHA G542	Advanced Physical Pharmaceutics	5		Elective	*	
			20			15	
II	PHA G617	Advanced Drug Delivery Systems	5	BITS G629T	Dissertation	16	
		Elective	*		or	or	
		Elective	*	BITS G639	Practice School	20	
		Elective	*				
			14			16/20	
M. Pharma. Pharmacy – Pharmaceutical Chemistry							
I	PHA G522	Chemistry of Macromolecules	4	BITS G540	Research Practice	4	
	PHA G532	Quality Assurance and Regulatory Affairs	5	PHA G611	Advanced Pharmacology	5	
	PHA G541	Computer Aided Drug Design	5	PHA G621	Advanced Medicinal Chemistry	5	
	PHA G543	Clinical Research	5		Elective	*	
			19			17	
II		Elective	*	BITS G629T	Dissertation	16	
		Elective	*		or	or	
		Elective	*	BITS G639	Practice School	20	
		Elective	*				
			12			16/20	

* Minimum 3 Units

Note: This is the suggested semesterwise pattern by the appropriate Senate appointed committee, subject to change if the situation warrants.

Pattern 1 Semesterwise Pattern for Students Admitted to Higher Degree Programmes in the First Semester								
Year	First Semester			U	Second Semester			U
M.E. Software System								
I	IS C415	Data Mining	3	BITS G540	Research Practice	4		
	SS G514	Object Oriented Analysis and Design	4	SS G515	Data Ware Housing	5		
	SS G562	Software Engineering and Management Elective	5*	SS G653	Software Architecture Elective	5*		
			15			17		
II		Elective	*	BITS G629T	Dissertation	16		
		Elective	*		or	20		
		Elective	*	BITS G639	Practice School			
		Elective	*					
			12			16/20		
Master of Business Administration								
I	MBA C312	Managerial Economics	3	MBA C319	Negotiation Skills & Techniques	2		
	MBA C314	Business Structure & Processes	3	MBA C412	Human Resource Management	4		
	MBA C320	Managerial Skills	2	MBA C416	Corporate Finance & Taxation	4		
	MBA C321	Legal and Economic Environment of Business	4	MBA C418	Marketing	4		
	MBA C322	Management Framework and Functions	2	MBA C419	Production & Operations Management	4		
	MBA C411	Organizational Behaviour	4	MBA C421	Supply Chain Management	4		
	MBA C413	Quantitative Methods	4	MBA C471	Management Information Systems	3		
	MBA C415	Financial & Management Accounting	4					
	MBA C431	Managerial Communication	2					
			28			25		
II	MBA C422	Business and Society	4	BITS G561	Dissertation	16		
	MBA C423	Business Policy & Strategic Management	4		or	20		
	MBA C424	International Business	3*	BITS G560	Practice School			
		Elective	*					
		Elective	*					
	Elective	*						
		23			16/20			
Master in Public Health								
I	MPH G510	Biostatistics & Computers in Public Health	5	BITS G620	Professional Practice I	3		
	MPH G512	Environmental and Occupational Health	4	MPH G521	Health Care Management	4		
	MPH G513	Public Health & Diseases	4	MPH G522	Preventive Nutrition & Health Promotion	4		
	BITS G515	Management Principles and Practices	4	MPH G523	Epidemic & Disaster Management	4		
	MPH G515	Communication in Health Care	4	MPH G692	Epidemiology	2		
		21	MPH G613	Health System and Society	2			
					19			
II	BITS G621	Professional Practice II	3	BITS G629T	Dissertation	16		
	MPH G531	Health Economics & Financial Management	4		or	20		
		Elective	*	BITS G639	Practice School			
		Elective	*					
			16			16/20		

* Minimum 3 Units

Note: This is the suggested semesterwise pattern by the appropriate Senate appointed committee, subject to change if the situation warrants.

Pattern 1 Semester-wise Pattern for Students Admitted to M. Phil. Chemistry Programme in First Semester								
Year	First Semester			U	Second Semester			U
I	BITS	G659	Technical Communication	4	BITS	G620	Professional Practice I	3
	CHEM	G551	Advanced Organic Chemistry	5	CHEM	G552	Advanced Inorganic Chemistry	5
	CHEM	G553	Advanced Physical Chemistry	5	CHEM	G554	Physical Methods in Chemistry	5
	CHEM	G555	Chemistry of Life Processes	4			Elective	3
				18				16
II	BITS	G621	Professional Practice II	3	BITS	G629T	Dissertation	16
			Elective	*			or	or
			Elective	*	BITS	G639	Practice School	20
			Elective	*				
				12				16/20

* Minimum 3 units

Note: This is a currently operative pattern as approved by the Senate-appointed committee, subject to change if the situation warrants.

**LIST OF COURSES FOR M.E./M.PHARM./
MBA PROGRAMMES:**

Biotechnology

Core Courses

BIO G512	Molecular Mechanism of Gene Expression	5
BIO G523	Advanced and Applied Microbiology	5
BIO G524	Animal Cell Technology	5
BIO G525	Environmental Biotechnology and Waste Management	5
BIO G542	Advanced Cell and Molecular Biology	5
BIO G643	Plant Biotechnology	5

Elective Courses (any seven)

BIO C417	Biomolecular Modeling	3 0 3
BIO C421	Enzymology	3 0 3
BIO C441	Biochemical Engineering	3 0 3
BIO C461	Recombinant DNA Technology	3 0 3
BIO G513	Microbial and Fermentation Technology	3 2 5
BIO G514	Molecular Immunology	3 2 5
BIO G515	Stem Cell and Regenerative Biology	3 1 4
BIO G522	Interferon Technology	3 1 4
BIO G532	Biostatistics and Biomodelling	3 1 4
BIO G612	Human Genetics	3 2 5
BIO G631	Membrane and Liposome Technology	3 1 4
BIO G632	Transgenic Technology	3 2 5
BIO G651	Protein and Enzyme Bioengineering	3 2 5
BIO G661	Gene Toxicology	3 1 4
BIO G671	Bioconversion Technology	3 2 5
BITS C467	Bioethics and Biosafety	3 0 3
EA C414	Introduction to Bioinformatics	3 0 3
BIO G526	Cancer Biology	3 0 3
BIO G642	Experimental Techniques	4*

Chemical

Core Courses

CHE G613	Advanced Mass Transfer	5
CHE G614	Advanced Heat Transfer	5

CHE G622	Advanced Chemical Engineering Thermodynamics	5
CHE G523	Mathematical Methods in Chemical Engineering	5
CHE G641	Reaction Engineering	5

Elective Courses (any six)

CHE C421	Biochemical Engineering	3 0 3
CHE C473	Advanced Process Control	3 1 4
CHE G512	Petroleum Refining and Petrochemicals	3 1 4
CHE G513	Environmental Management Systems	3 2 5
CHE G522	Polymer Technology	3 1 4
CHE G524	Introduction to Multiphase flow	3 1 4
CHE G525	Chemical Process and Equipment Design	3 1 4
CHE G526	Nuclear Engineering	3 1 4
CHE G527	Energy Conservation and Management	3 1 4
CHE G528	Introduction to Nano Science & Technology	3 1 4
CHE G529	Paper and Pulp Technology	3 1 4
CHE G532	Alternate Energy Resources	3 1 4
CHE G551	Advanced Separation Technology	3 2 5
CHE G617	Petroleum Refinery Engineering	3 2 5
CHE G618	Petroleum Downstream Processing	3 2 5
CHE G619	Process Intensification	3 2 5
CHE G620	Energy Integration Analysis	3 1 4

Chemical with Specialization in Petroleum Engineering

Core Courses

CHE G616	Petroleum Reservoir Engineering	5
CHE G617	Petroleum Refinery Engineering	5
CHE G622	Advanced Chemical Engineering Thermodynamics	5
CHE G523	Mathematical Methods in Chemical Engineering	5
CHE G618	Petroleum Downstream Processing	5

CHE G641	Reaction Engineering	5	CE G526	Systems Approach to Water Resources Modelling	3 1 4
Elective Courses (any six)					
CHE C473	Advanced Process Control	3 1 4	CE G527	Construction Management	3 1 4
CHE G511	Fluidization Engineering	3 1 4	CE G528	Selection of Construction Equipment and Modelling	3 1 4
CHE G513	Environmental Management Systems	3 2 5	CE G530	Design of Construction Operation	3 1 4
CHE G522	Polymer Technology	3 1 4	CE G531	Environmental Conservation	3 1 4
CHE G532	Alternate Energy Resources	3 1 4	CE G533	Advanced Composite Materials for Structures	3 1 4
CHE G551	Advanced Separation Technology	3 2 5	CE G542	Water Resources and Management	3 1 4
CHE G613	Advanced Mass Transfer	3 2 5	CE G610	Computer Aided Analysis and Design in Civil Engineering	3 2 5
CHE G614	Advanced Heat Transfer	3 2 5	CE G529	Construction Project Control Systems	3 1 4
CHE G619	Process Intensification	3 2 5	CE G616	Bridge Engineering	3 1 4
CHE G620	Energy Integration Analysis	3 2 5	CE G618	Design of Multi-storey Structures	3 1 4
Civil with Specialization in Infrastructure Systems					
Core Courses					
CE G515	Fundamentals of Systems Engineering	4	EA C442	Remote Sensing and Image Processing	3 0 3
CE G523	Transportation Systems Planning and Management	4	IS C472	Geographical Information System	3 0 3
CE G525	Water Resources Planning and Management	4	Civil with Specialization in Structural Engineering		
CE G619	Finite Element Analysis	5	Core Courses		
CE G520	Infrastructure Planning and Management	4	CE G551	Dynamics of Structures	4
Elective Courses (any six)					
CE G552	Advanced Structural Mechanics and Stability	4	CE G552	Advanced Structural Mechanics and Stability	4
BITS C494	Environmental Impact Assessment	3 1 4	CE G617	Advanced Structural Analysis	4
BITS C469	Financing Infrastructure Projects	3 0 3	CE G619	Finite Element Analysis	5
BITS C474	Rural Infrastructure Planning	3 0 3	CE G615	Earthquake Engineering	4
CE G512	Topics in Environmental Engineering	3 1 4	Elective Courses (any six)		
CE G513	Advanced Computational Techniques	3 1 4	CE G511	Matrix Method in Civil Engineering	3 2 5
CE G516	Multicriteria Analysis in Engineering	3 1 4	CE G513	Advanced Computational Techniques	3 1 4
CE G517	Waste Management Systems	3 1 4	CE G514	Structural Optimization	3 1 4
CE G522	Pavement Design, Maintenance and Management	3 2 5	CE G521	Topics in Structural Engineering	3 2 5
CE G524	Urban Mass Transit Planning, Operations and Management	3 1 4	CE G532	Advanced Soil Mechanics	3 1 4
			CE G533	Advanced Composite Materials for Structures	3 1 4
			CE G553	Theory of Plates and Shells	3 1 4

CE G554	Advanced Structural Design	3 1 4	CE G528	Selection of Construction Equipment and Modeling	3 1 4
CE G610	Computer Aided Analysis and Design in Civil Engineering	3 2 5	CE G537	Transport Economics and Finance	3 1 4
CE G611	Computer Aided Analysis and Design	3 2 5	CE G539	Introduction to Discrete Choice Theory	4*
CE G612	Advanced Steel Structures	3 1 4	CE G543	Traffic Flow Theory	3 1 4
CE G613	Advanced Concrete Structures	3 1 4	CE G545	Airport Planning and Design	3 1 4
CE G614	Prestressed Concrete Structures	3 1 4	CE G546	Highway Construction Practices	3 1 4
CE G616	Bridge Engineering	3 1 4	CE G547	Pavement Failures, Evaluation and Rehabilitation	3 1 4
CE G618	Design of Multi-storey Structures	3 1 4	CE G548	Pavement Management Systems	3 1 4
CE G620	Advanced Foundation Engineering	3 1 4	CE G549	Rural Road Technology	3 1 4
CE G621	Fluid Dynamics	3 2 5	CE G616	Bridge Engineering	3 1 4
CE G622	Soil-Structure Interaction	3 1 4	CE G619	Finite Element Analysis	3 2 5
CE G623	Ground Improvement Techniques	3 1 4	Civil with Specialization in Water Resource Engineering		
CE G631	Selected Topics in Soil Mechanics and Geotechnical Engineering	3 1 4	Core Courses		
CE G641	Theory of Elasticity and Plasticity	3 2 5	CE G526	Systems Approach to Water Resources Modeling	4
Civil with Specialization in Transportation Engineering			CE G555	Remote Sensing and GIS in Water Resources	4
Core Courses			CE G556	Advanced Computational Hydraulics	4
CE G523	Transportation Systems Planning and Management	4	CE G557	Stochastic Hydrology	4
CE G534	Pavement Material Characterization	4	CE G558	Advanced Groundwater Hydrology	4
CE G535	Highway Geometric Design	4	CE G559	Soft Computing in Water Resources	4
CE G536	Traffic Engineering and Safety	4	Elective Courses (any five)		
CE G518	Pavement Analysis and Design	4	BITS C494	Environmental Impact Assessment	3 1 4
CE G524	Urban Mass Transit Planning Operations and Management	4	CE G516	Multicriteria Analysis in Engineering	4
Elective Courses (any six)			CE G517	Waste Management Systems	4
BITS C494	Environmental Impact Assessment	3 1 4	CE G525	Water Resources Planning and Management	3 1 4
CE G520	Infrastructure Planning and Management	3 1 4	CE G621	Fluid Dynamics	2 3 5
			CE G560	Hydrologic Simulation Laboratory	4
			CE G561	Impact of Climate Change on Water Resources and Environment	4

Communication Engineering**Core Courses**

EEE C415	Digital Signal Processing #	4
EEE G581	RF and Microwave Engineering	5
EEE G612	Coding Theory and Practice	5
EEE G591	Optical Communication	5
EEE G592	Mobile and Personal Communication	5
EEE G622	Advanced Digital Communication	5

Elective Courses (any five)

BITS G553	Real Time Systems	3 1 4
BITS G554	Data Compression	3 1 4
CS C461	Computer Networks	3 0 3
CS G541	Pervasive Computing	4
CS G553	Reconfigurable Computing	5
CS G555	Systems Specification and Modeling	3 3 4
EA C415	Introduction to MEMS	4
EA C451	Internetworking Technologies	3 0 3
EA C473	Multimedia Computing	3 0 3
EEE C414	Telecom Switching Systems and Networks	3 0 3
EEE C472	Satellite Communication	3 0 3
EEE G510	RF Microelectronics	5
EEE G512	Embedded System Design	3 1 4
EEE G521	Optoelectronic Devices, Circuits and Systems	3 2 5
EEE G582	Telecom Network Management	3 2 5
EEE G613	Advanced Digital Signal Processing	5
EEE G626	Hardware Software Co-Design	4
EEE G627	Network Embedded Application	4
IS C462	Network Programming	3 0 3
MEL G621	VLSI Design	3 2 5

Computer Science**Core Courses**

CS G513	Network Security	4
CS G524	Advanced Computer Architecture	5

CS G525	Advanced Computer Networks	5
CS G526	Advanced Algorithms and Complexity	5
CS C623	Advanced Operating Systems	5

Elective Courses (any six)

BITS C464	Machine Learning	3 0 3
BITS G553	Real-Time Systems	5
CS C415	Data Mining	3 0 3
CS C422	Parallel Computing	3 0 3
CS C446	Data Storage and Networks	3 0 3
CS G541	Pervasive Computing	4
CS G551	Advance Compilation Techniques	5
CS G553	Reconfigurable Computing	5
CS G554	Distributed Data Systems	3 2 5
CS G523	Software for Embedded Systems	3 2 5
CS G612	Fault Tolerant System Design	2 3 5
EA C451	Internetworking Technologies	3 0 3
EA C461	Artificial Engineering	3
EA C473	Multimedia Computing	3 0 3
EEE G512	Embedded System Design	3 1 4
EEE G582	Telecom Network management	5
EEE G627	Networked Embedded Applications	3 1 4

Design Engineering**Core Courses**

DE G631	Materials Testing and Technology	5
DE G531	Product Design	5
DE G611	Dynamics and Vibration	5
ME G511	Mechanism and Robotics	5
ME G512	Finite Element Methods	5
ME G611	Computer Aided Analysis and Design	5

Elective Courses (any five)

DE G513	Tribology	3 2 5
DE G514	Fracture Mechanics	3 2 5
DE G522	Design Projects	3 2 5
EA C415	Introduction to MEMS	3 1 4
ME G535	Advanced Engineering Mathematics	3 2 5

ME G515	Computational Fluid Dynamics	3 2 5
ME G521	Mechanical System Design	3 2 5
ME G532	Machine Tool Engineering	3 2 5
ME G641	Theory of Elasticity and Plasticity	3 2 5
MSE G511	Mechatronics	3 2 5
MSE G531	Concurrent Engineering	3 2 5
MST G511	Nondestructive Testing Techniques	3 2 5
MST G522	Advanced Composites	3 2 5
MST G531	Experimental Stress Analysis Techniques	3 2 5

Electrical with specialization in Power Electronics & Drives

Core Courses

EEE G541	Distribution Apparatus and Configuration	5
EEE G542	Power Electronics Converter	5
EEE G543	Power Devices Microelectronics and Selection	5
EEE G545	Control and Instrumentation Systems	5
EEE G552	Solid State Drives	5
EEE G546	System Simulation	5

Elective Courses (any five)

BITS C462	Renewable Energy	
EA C472	Photovoltaic Cells	
EEE C422	Modern Control Systems	
EEE C462	Advanced Power Systems	
EEE G544	Steady State and Dynamics of Electrical Motors	3 2 5
EEE G553	Utility Applications of Power Electronics	3 0 3
EEE G554	Soft Switching Converter Technologies	3 0 3
EEE G555	Transformer and Motor Design	3 0 3
EEE G556	DSP based Implementation Drivers	3 0 3
EEE G557	Drives for Electric Traction	3 0 3

Embedded Systems

Core Courses

BITS G512	Embedded System Design	4
BITS G553	Real Time Systems	5
CS G523	Software for Embedded Systems	5
EEE G626	Hardware Software Co-Design	5
MEL G642	VLSI Architecture	5

Elective Courses (any six)

CS G541	Pervasive Computing	4
CS G553	Reconfigurable Computing	5
CS G611	Distributed Processing Systems	2 2 4
CS C412	Fault Tolerant System Design	2 3 5
EA C415	Introduction to MEMS	4
EEE C415	Digital Signal Processing	3 1 4
EEE G613	Advanced Digital Signal Processing	5
EEE G625	Safety Critical Embedded System Design	4
EEE G627	Network Embedded Application #	4
MEL G621	VLSI Design	3 2 5
MEL G623	Advanced VLSI Design	5
MEL G624	Advanced VLSI Architectures	5
MSE G511	Mechatronics	3 2 5

Manufacturing Systems Engineering

Core Courses

EA C412	Flexible Manufacturing Systems	4
ME C443	Quality Control Assurance and Reliability	3
ME G511	Mechanism and Robotics	5
MSE G521	World Class Manufacturing	5
ITEB G621	Supply Chain Management	4
MSE G512	Manufacturing Planning and Control	5

Elective Courses (any five)

DE G522	Design Projects	3 2 5
MSE G511	Mechatronics	3 2 5
MSE G513	Maintenance Engineering	3 1 4
MSE G514	Leadership and Managing Change	3 1 4

MSE G531	Concurrent Engineering	3 2 5	ME G621	Fluid Dynamics	5
ME G539	Computer Integrated Manufacturing	3 2 5	Electives Courses (any five)		
ME G535	Advanced Engineering Mathematics	3 2 5	EA C415	Introduction to MEMS	4*
ME G538	Toyota Production System	3 2 5	EA C417	Micro-fluidics and its Applications	4*
Mechanical Engineering			ME C461	Refrigeration & Air-conditioning	3 0 3
Core Courses			ME G513	Heating and Cooling of Buildings	5
ME C443	Quality Control Assurance and Reliability	3	ME G516	Energy Systems Engineering	5
ME G511	Mechanism and Robotics	5	ME G535	Advanced Engineering Mathematics	5
ME G512	Finite Element Methods	5	ME G536	Thermal Equipment Design	5
ME G532	Machine Tool Engineering	5	ME G537	Cryogenic Engineering	5
ME G611	Computer Aided Analysis and Design	5	Microelectronics		
ME G641	Theory of Elasticity and Plasticity	5	Core Courses		
Elective Courses (any five)			MEL G611	IC Fabrication Technology	5
DE G513	Tribology	3 2 5	MEL G621	VLSI Design	5
DE G522	Design Projects	3 2 5	MEL G631	Physics & Modeling of Microelectronic Devices	5
DE G611	Dynamics and Vibrations	3 2 5	MEL G632	Analog IC Design	5
EA C415	Introduction to MEMS	3 1 4	MEL G642	CAD for IC Design	5
ME C472	Precision Engineering	3 0 3	Elective Courses (any six)		
ME G513	Heating and Cooling of Buildings	3 2 5	CS G553	Reconfigurable Computing	5
ME G514	Turbomachinery	3 2 5	CS G562	Advanced Architecture and Performance Evaluation	3 2 5
ME G515	Computational Fluid Dynamics	3 2 5	EEE C415	Digital Signal Processing	3 1 4
ME G631	Heat Transfer	3 2 5	EEE G510	RF Microelectronics	5
ME G535	Advanced Engineering Mathematics	3 2 5	EEE G512	Embedded System Design	3 1 4
Mechanical with specialization in Thermal Engineering			EEE G613	Advanced Digital Signal Processing	3 1 4
Core Courses			EEE G626	Hardware Software Co-Design	4
BITS C462	Renewable Energy	3	MEL G512	Optoelectronic Devices Circuits and Systems	3 2 5
ME G514	Turbomachinery	5	MEL G612	Integrated Electronics Design	2 2 4
ME G515	Computational Fluid Dynamics	5	MEL G623	Advanced VLSI Design	5
ME G533	Conduction and Radiation Heat Transfer	5	MEL G625	Advanced Analog and Mixed Signal Design	5
ME G535	Convective Heat and Mass Transfer	5	MEL G626	VLSI Test and Testability	5
			MEL G642	VLSI Architectures	2 2 4

Pharmacy			PHA G617	Advanced Drug Delivery Systems	5
Core Courses			PHA G632	Dosage Form Design	5
PHA G532	Quality Assurance and Regulatory Affairs	5		Elective Courses (any five)	
PHA G543	Clinical Research	5	BITS C467	Bioethics and Biosafety	3 0 3
PHA G611	Advanced Pharmacology	5	PHA G611	Advanced Pharmacology	2 3 5
PHA G612	Pharmacokinetics and Clinical Pharmacy	5	PHA G613	Pharmaceutical Biotechnology	3 2 5
PHA G621	Advanced Medicinal Chemistry	5	PHA G614	Clinical Pharmacy and Therapeutics	3 2 5
PHA G632	Dosage Form Design	5	PHA G616	Pharmaceutical Administration and Management	3 2 5
	Elective Courses (any five)		PHA G619	Screening Methods & Techniques in Pharmacology	5*
BIO C417	Biomolecular Modeling	3 0 3	PHA G642	Lab Projects	6
BITS C467	Bioethics and Biosafety	3 0 3		M.Pharm. with specialization in Pharmaceutical Chemistry	
PHA G512	Chemistry of Natural Drugs	3 1 4		Core Courses	
PHA G521	Molecular Biology and Immunology	3 1 4	PHA G522	Chemistry of Macromolecules	4
PHA G541	Computer Aided Drug Design	3 2 5	PHA G532	Quality Assurance and Regulatory Affairs	5
PHA G542	Advanced Physical Pharmaceutics	3 2 5	PHA G541	Computer Aided Drug Design	5
PHA G613	Pharmaceutical Biotechnology	3 2 5	PHA G543	Clinical Research	5
PHA G614	Clinical Pharmacy and Therapeutics	3 2 5	PHA G611	Advanced Pharmacology	5
PHA G615	Pharmacy Practice	3 2 5	PHA G621	Advanced Medicinal Chemistry	5
PHA G616	Pharmaceutical Administration and Management	3 2 5		Elective Courses (any five)	
PHA G619	Screening Methods & Techniques in Pharmacology	5*	BITS C467	Bioethics and Biosafety	3 0 3
PHA G622	Chemistry of Natural Drugs and Macromolecules	3 2 5	PHA G512	Chemistry of Natural Drugs	3 1 4
PHA G642	Lab Projects	6	PHA G612	Pharmacokinetics and Clinical Pharmacy	3 2 5
	M.Pharm. with specialization in Pharmaceutics		PHA G613	Pharmaceutical Biotechnology	3 2 5
	Core Courses		PHA G618	Retro-synthetic Analysis	3 2 5
PHA G532	Quality Assurance and Regulatory Affairs	5	PHA G619	Screening Methods & Techniques in Pharmacology	5*
PHA G543	Clinical Research	5	PHA G642	Lab Projects	6
PHA G612	Pharmacokinetics and Clinical Pharmacy	5		Software Systems	
PHA G542	Advanced Physical Pharmaceutics	5		Core Courses	
			IS C415	Data Mining	3
			SS G514	Object Oriented Analysis and Design	4

SS G562	Software Engineering and Management	5	MBA C422	Business and Society	4
SS G515	Data Ware Housing	5	MBA C423	Business Policy and Strategic Management	4
SS G653	Software Architecture	5	MBA C424	International Business	4
Elective Courses (any six)			MBA C431	Managerial Communication	2*
BITS C481	Computer Networks	3 0 3	MBA C471	Management Information Systems	4
BITS G553	Real-Time Systems	5	Elective Courses		
CS C422	Parallel Computing	3 0 3	For Engineering & Technology Management		
CS G541	Pervasive Computing	4	BITS C468	New Venture Creation	3 0 3
CS G523	Software for Embedded Systems	3 2 5	BITS C489	Enterprise Resource Planning	3 0 3
EA C451	Internetworking Technologies	3 0 3	BITS C493	Business Analysis and Valuation	3 0 3
EA C473	Multimedia Computing	3 0 3	EA C475	Financial Engineering	3 0 3
IS C462	Network Programming	3 0 3	FIN C413	Risk Management and Insurance	3 0 3
SS G513	Network Security	3 1 4	MBA C414	Technology Management	3 0 3
SS G551	Advance Compilation Techniques	5	MBA C425	R & D Management	3 0 3
SS G552	Software Testing Methodologies	4	MBA C429	Recent Advances in ETM	4
SS G554	Distributed Data Systems	3 2 5	MBA C437	Security Analysis and Portfolio Management	3 0 3
Master of Business Administration			MBA C451	Internetworking Technologies	3 0 3
Core Courses			MBA C454	Project Appraisal	3 0 3
MBA C312	Managerial Economics	3	MBA C482	Creating and Leading Entrepreneurial Organization	3 0 3
MBA C314	Business Structure and Processes	3*	MBA C483	Marketing Research	3 0 3
MBA C319	Negotiation Skills and Techniques	2 0 2	MBA G512	Manufacturing Strategy	4
MBA C320	Managerial Skills	2	MBA G522	Total Quality Management	4
MBA C321	Legal and Economic Environment of Business	4*	MBA G523	Project Management	4
MBA C322	Management Framework and Functions	2 0 2	MBA G552	Total Productive Maintenance	4
MBA C411	Organizational Behavior	4	MBA G622	Software Project Management	4
MBA C412	Human Resource Management	4	For IT Enabled Services Management		
MBA C413	Quantitative Methods	4	BITS C468	New Venture Creation	3 0 3
MBA C415	Financial and Management Accounting	4	BITS C489	Enterprise Resource Planning	3 0 3
MBA C416	Corporate Finance and Taxation	4	BITS C493	Business Analysis and Valuation	3 0 3
MBA C418	Marketing	4	EA C474	Retail Management Systems	3 0 3
MBA C419	Production and Operations Management	4	FIN C413	Risk Management and Insurance	3 0 3
MBA C421	Supply Chain Management	4	MBA C426	Database Management Systems	4
			MBA C427	e-Business and Internet Marketing	4

MBA C428	Internet Security and Cyber-laws	4	MPH G540	Role of Voluntary Bodies/NGO's in Public Health	3
MBA C433	Advertising and Sales Promotion	3 0 3	MPH G661	Research Methodology I	5
MBA C436	Strategic Financial Management	3 0 3	MPH G665	Hospital Operations Management	3
MBA C437	Security Analysis and Portfolio Management	3 0 3	MPH G681	Strategic Management	3
MBA C451	Internetworking Technologies	3 0 3	M.Phil. Chemistry		
MBA C454	Project Appraisal	3 0 3	Core Courses		
MBA C482	Creating and Leading Entrepreneurial Organization	3 0 3	CHEM G551	Advanced Organic Chemistry	5*
MBA C481	Expert Systems	4	CHEM G552	Advanced Inorganic Chemistry	5*
MBA C488	Services Management System	3 0 3	CHEM G553	Advanced Physical Chemistry	5*
MBA G622	Software Project Management	4	CHEM G554	Physical Methods in Chemistry	5*
Master in Public Health			CHEM G555	Chemistry of Life Processes	5*
Core Courses			Elective Courses (any four)		
BITS G515	Management Principles and Practices	4*	BIO G513	Microbial and Fermentation Technology	5*
MPH G510	Biostatistics & Computers in Public Health	5	BITS G654	Advanced Instrumentation Techniques	5*
MPH G512	Environmental & Occupational Health	4	CHEM C412	Photochemistry and Laser Spectroscopy	3 0 3
MPH G513	Public Health & Diseases	4	CHEM C422	Statistical Thermodynamics	3 0 3
MPH G515	Communication in Health Care	4	CHEM C431	Stereochemistry and Reaction Mechanism	3 0 3
MPH G521	Health Care Management	4	CHEM G513	Advanced Nuclear and Radio Chemistry	5*
MPH G522	Preventive Nutrition & Health Promotion	4	CHEM G521	Environmental Chemistry	5*
MPH G523	Epidemic & Disaster Management	4	CHEM G531	Recent Advances in Chemistry	5*
MPH G531	Health Economics & Financial Management	4	CHEM G541	Chemical Applications of Group Theory	5*
MPH G613	Health Systems and Society	2	CHEM G556	Catalysis	4*
MPH G692	Epidemiology	2	CHEM G557	Solid Phase Synthesis and Combinatorial Chemistry	4*
Elective Courses (any three)			CHEM G558	Electronic Structure Theory	5*
BITS C467	Bioethics and Biosafety	3 0 3	CHEM G559	Bioinorganic Chemistry	4*
MPH C431	Accounting & Finance	4	CHEM G561	Heterocyclic Chemistry	5*
MPH G535	Family & Community Health Measures	3	CHEM G562	Solid State Chemistry	4*
MPH G537	Law & Ethics in Public Health	3	CHEM G563	Advanced Statistical Mechanics	5*
MPH G538	Telemedicine	3			
MPH G539	Inter-sectoral co-ordination in Health Services	3			

EEE C432	Medical Instrumentation	3 0 3	ECON G541	Economic Systems Analysis	5
PHA G621	Advanced Medicinal Chemistry	2 3 5	ENGL G511	Growth of the English Language	5

HDCC is empowered to add the following course as a deficiency course on case by case basis if the student is found to be deficient in Mathematics.

CHEM C453	Mathematics for Chemists	4*	ENGL G512	Language and S & T	5
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* This is the total units and its break-up in terms of lectures and practical/seminars/project may be announced from time to time through the timetable.

LIST OF GENERAL/SPECIAL COURSES FOR M.PHIL. PROGRAMMES

BIO G511	Population and Quantitative Genetics	5	ENGL G571	Applied Communication I	5
BIO G522	Interferon Technology	2 2 4	ENGL G581	Applied Communication II	5
BIO G541	Neural Network Analysis	5	ENGL G591	Project Formulation and Preparation	5
BIO G551	Membrane Biology	5	ENGL G611	Twentieth Century English Literature	5
BITS G511	Advanced Project	5	ET G511	Science and Technology Dynamics	5
BITS G513	Study in Advanced Topics	5	ET G521	Hi-Tech Management	5
BITS G514	Environmental Health	3 0 3	ET G531	Systems Engineering	5
BITS G644	Development and use of Computer Software	5	ET G541	Overview of Technology	5
BITS G654	Advanced Instrumentation Techniques	5	HUM G511	Introduction to Health System	3 0 3
CHEM G511	Nuclear and Radio Chemistry	5	MATH G511	Design and Analysis of Algorithms	5
CHEM G513	Advanced Nuclear and Radiochemistry	5	MATH G512	Selected Topics in Advanced Mathematics for Engineering Situations	5
CHEM G521	Environmental Chemistry	5	MATH G521	Applied Functional Analysis	5
CHEM G531	Recent Advances in Chemistry	5	MATH G531	Number Theory	5
CHEM G541	Chemical Applications of Group Theory	5	MATH G541	Advanced Methods in Discrete Mathematics	5
CHEM G551	Advanced Organic Chemistry	5	MATH G611	Algebraic Number Theory	5
CHEM G552	Advanced Inorganic Chemistry	5	MATH G612	Riemann Surfaces	5
ECON G511	Dynamic Modelling and Control of National Economies	5	MATH G621	Fibre Bundles	5
ECON G521	Modern Cost Engineering	5	MATH G622	Algebraic Geometry	5
ECON G531	Theory of Macroeconomic Policy	5	MATH G632	Lie Groups & Lie Algebras	5
			MATH G642	Complex Manifolds	5
			MGTS G511	Advanced Marketing Theories and Advertising	5
			MGTS G521	Business Policy - Structure and Organization	5

MGTS G531	Recent Advances in Organization Behaviour Theory	5	BITS G539	Research Project II	6
MGTS G541	Management Information and Decision Support Systems	5	BITS G619	Professional Practice	4
MGTS G551	Frontiers in Financial Management	5	BITS G620	Professional Practice I	3
MGTS G561	Institutional Finance & Project Appraisal	5	BITS G621	Professional Practice II	3
PHY G511	Theoretical Physics	5	BITS G629T	Dissertation	25 (Max.)
PHY G521	Nuclear and Particle Physics	5	BITS G639	Practice School	20
PHY G531	Selected Topics in Solid State Physics	5	BITS G649	Reading Course	5
PHY G541	Physics of Semiconductor Devices	5	NOTE: Courses with 4 level numbers given above are advanced level electives from the offering of the Integrated First Degree programmes.		
SKILL G611	Computer Operation and Software Development I	5	COMMON POOL OF ELECTIVES FOR HIGHER DEGREES		
SKILL G612	Computer Operation and Software Development II	5	BITS G513	Study in Advanced Topics	5
SKILL G621	Computer Maintenance I	5	BITS G649	Reading Course	5
SKILL G622	Computer Maintenance II	5	NOTE: The courses from this pool will be available as electives to all higher degree students subject to approval from higher degree counseling committee.		
SKILL G631	Professional Communication I	5	Ph.D. PROGRAMME		
SKILL G632	Professional Communication II	5	Structure		
SKILL G641	Modern Experimental Methods I	5	1. Course Work		
SKILL G642	Modern Experimental Methods II	5	The various categories of courses, for the whole possible range of input of Ph.D. students are described in the Academic Regulations. In most cases, this course work would consist of courses which are required to be completed for a higher degree programme of the Institute. Further, the qualifying examination would also be conducted on the basis of these courses. Departures from these normal situations are described in the Academic Regulations.		
SKILL G651	Techniques in Development Management I	5	2. Ph.D. Qualifying Examination		
SKILL G652	Techniques in Development Management II	5	3. Foreign Language when required		
SKILL G661	Research Methodology I	5	The foreign language will be prescribed as an eligibility requirement for the Ph.D. only when the supervisor and/or the Dean Research & Consultancy have made recommendations for the same justifying its need for the particular topic of research and the literature available and this recommendation has been accepted by the Research Board. Otherwise English or an Indian language, as the case may be, would suffice the requirement of the foreign language.		
SKILL G662	Research Methodology II	5			
All courses given above are unstructured. Actual structuring will be done from time to time.		Actual			
COMMON COURSES FOR HIGHER DEGREES					
BITS C437	Technical Communication	3	0	3	
BITS G529	Research Project I	6			

4. Teaching Practice/Practice Lecture Series

BITS C791T Teaching Practice I	1
BITS C792T Teaching Practice II	1

The above two separate and independent courses, to be taken one at a time, are designed and operated to provide cumulative experience for a Ph.D. student in the practice of teaching.

BITS E793T Practice Lecture Series I	1
BITS E794T Practice Lecture Series II	1

These two courses are in lieu of the two courses viz. Teaching Practice I and II respectively, and are to be taken one at a time. These are designed and operated to provide cumulative experience for a Ph.D. student in the Practice of teaching in his own professional setting where it is not feasible to operate the teaching practice courses. The student will deliver a predetermined series of technical talks before a professional audience as approved by Dean R&C.

5. Seminar/Independent Study

1. BITS C797T Ph.D. Seminar (Min) 2

While the total minimum number of units is 2, registration is done for one unit in each semester/term until the submission of the thesis.

2. BITS C790T Independent Study (Min) 2

A student may be asked to register in this course in lieu of BITS C797T by Dean, Research & Consultancy if situation so warrants. While the total number of units is 2, registration is done for one unit in each semester/term until the submission of the thesis.

6. Thesis

BITS C799T Ph.D. Thesis	(Min) 40
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While the total minimum units assigned to this course are 40, the distribution of the units between different semesters/terms would be determined by the Dean, Research & Consultancy.

7. General

The 'Doctoral Counselling Committee (DCC)' consisting of (i) Dean, Research & Consultancy Division (Convenor), (ii) Dean, Academic

Registration & Counselling Division (iii) Dean, Instruction Division (iv) Dean, Practice School Division (v) Dean, Work Integrated Learning Programmes Division, and (vi) Two members nominated by the Senate monitors the academic progress of Ph.D. students similar to the monitoring of academic progress of students of integrated First Degree and Higher Degree programmes by the ACB. The decisions of the DCC are reported to the Research Board and the Senate.

A Doctoral Advisory Committee (DAC) is appointed by the Dean, R & C for each candidate admitted to the Ph.D. programme. This committee consists of at least two faculty members from the broad area in which the candidate opts to pursue the Ph.D., besides the Dean, R&C.

Ph.D. Aspirants Scheme for Professionals

This programme enables experienced personnel and professionals working in industries and R&D organisations to work for a Ph.D. degree of the Institute in their respective work environment. This makes it possible for practicing professionals to be offered the same challenges that are traditionally offered to teachers in universities. Candidates, sponsored by their organizations, work for the Ph.D. degree without any dislocation from their work environment on research problems relevant to their organizations.

Admission to this programme is done through what is known as Ph.D. Aspirants Scheme. Ph.D. Aspirants will be first asked to write the qualifying examination. The Ph.D. qualifying examination will always be based on the courses of one of the higher degree programmes of the institute. Whenever a Ph.D. Aspirant already possesses a degree equivalent to a higher degree of the institute, the qualifying examination for him will be based on such a degree. The institute recognizes that there may be professionals who might not possess a degree equivalent to a higher degree of the institute, but has gained knowledge and skills through experience (substantiated by documentary evidence), which could be treated as equivalent to one of the higher degrees of the institute. For convenience of operation, for these cases, the institute has devised a higher degree programme called M.Phil (Applied) with courses that could be used for designing the qualifying examination for such candidates.

A list of courses for M.Phil.(Applied) is given below, from which a minimum number of 8 courses are to be chosen.

M.Phil. (Applied)

BITS E511	Computer Applications I	4	BITS E548	Public Administration II	4
BITS E512	Computer Applications II	4	BITS E551	Physical and Mathematical Sciences I	4
BITS E521	Technical Communication I	4	BITS E552	Physical and Mathematical Sciences II	4
BITS E522	Technical Communication II	4	BITS E561	Use of English for Professional Purposes I	4
BITS E531	Social, Behavioral & Economic Sciences I	4	BITS E562	Use of English for Professional Purposes II	4
BITS E532	Social Behavioral & Economic Sciences II	4	BITS E571	Methods of Planning and Development I	4
BITS E533	Modern Experimental Techniques-I	4	BITS E572	Methods of Planning and Development II	4
BITS E534	Modern Experimental Techniques II	4	BITS E573	Study in Advanced Topics I	5
BITS E535	Management Methods & Techniques I	4	BITS E574	Study in Advanced Topics II	5
BITS E536	Management Methods & Techniques II	4	BITS E583	Case Studies I	4
BITS E537	Systems Sciences and Engineering I	4	BITS E584	Case Studies II	4
BITS E538	Systems Science and Engineering II	4	BITS E591	Science and Technology Development I	4
BITS E541	Chemical and Life Science I	4	BITS E592	Science and Technology Development II	4
BITS E542	Chemical and Life Science II	4	BITS E593	Reading Course I	5
BITS E543	Instrumentation Engineering I	4	BITS E594	Reading Course II	5
BITS E544	Instrumentation Engineering II	4	BITS E611	Internship I	20
BITS E545	Project and Consultancy I	4	BITS E612	Internship II	20
BITS E546	Project and Consultancy II	4	BITS E661	Research Methodology I	5
BITS E547	Public Administration I	4	BITS E662	Research Methodology II	5

Note: No direct admission to M.Phil.(Applied) will be done. Courses described above will be used for students admitted to the Ph.D. programmes under the Ph.D. Aspirant Scheme.