

PART IV
DETAILS OF PROGRAMMES

Legend

AAOC	Analysis and Application Oriented Courses
Bio	Biological Sciences
BIOT	Biotechnology
CDC	Compulsory Discipline Courses
CE	Civil Engineering
Che	Chemical
Chem	Chemistry
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, 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
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	M.Phil. 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

STRUCTURE OF THE INTEGRATED FIRST DEGREE PROGRAMMES

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-7 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
PHA C212	Pharmaceutical Analysis	2 3 3
PHA C241	Microbiology	2 3 3
PHY C131	Physics I (Mechanics, Waves & Optics)	3 0 3
PHY C132	Physics II (Electricity, Magnetism & Modern Physics)	3 0 3
PHY C212	Classical Mechanics	3 0 3
PHY C221	Modern Physics	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.

BIO C111	General Biology	3 0 3	ES C263	Microprocessors Programming & Interfacing	3 2 4
CHEM C221	General Chemistry	3 0 3	ES C272	Electrical Sciences II	3 0 3
PHY C122	General Physics	3 0 3	INSTR C272	Circuits & Signals	3 0 3
SCI C121	Social Hygiene	3 0 3	ME C211	Applied Thermodynamics	3 0 3
SCI C212	Applied Nutrition	3 0 3	ME C212	Transport Phenomena I	3 0 3
SCI C311	Agricultural Science	3 0 3	MF C211	Applied Thermodynamics	3 0 3
			MF C212	Transport Phenomena I	3 0 3
			NA C211	Ocean Engineering	3 0 3
			NA C212	Transport Phenomena I	3 0 3
(iii) Core Mathematics			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.		
MATH C191	Mathematics I(Advanced Calculus)	3 0 3	ENGG C111	Electrical and Electronics Technology	3 0 3
MATH C192	Mathematics II (Complex Variables and Linear Algebra)	3 0 3	ENGG C212	Introduction to Systems	3 0 3
MATH C222	Discrete Structures for Computer Science	3 0 3	ENGG C232	Engineering Materials	3 0 3
MATH C241	Mathematics III (Differential Equations)	3 0 3	ENGG C241	Mechanical Technology	3 0 3
(iv) Technical Arts			ENGG C242	Maintenance & Safety	3 0 3
TA C111	Engineering Graphics	2 4 4	ENGG C264	Fluid and Solid Mechanics	3 0 3
TA C112	Workshop Practice	2 4 4	ENGG C272	Process Technology	3 0 3
TA C162	Computer Programming I	3 0 3	ENGG C282	Industrial Engineering Techniques	3 0 3
TA C211	Measurement Techniques I	0 4 2	ENGG C291	Electronics and Instrumentation Technology	3 0 3
TA C222	Measurement Techniques II	1 6 4	ES C261	Digital Electronics and Microprocessors	3 0 3
TA C231	Business Communication	3 0 3			
TA C252	Computer Programming II	3			
TA C312	Technical Report Writing	3			
(v) Engineering Science			(vi) Analysis and Application Oriented Courses		
CE C212	Transport Phenomena I	3 0 3	AAOC C111	Probability and Statistics	3 0 3
CE C241	Analysis of Structures	3 0 3	AAOC C221	Graphs & Networks	3 0 3
CHE C213	Fluid Flow Operations	3 0 3	AAOC C222	Optimisation	3 0 3
CHE C221	Chemical Process Calculations	3 0 3	AAOC C311	Data Processing	3 0 3
ECE C272	Circuits & Signals	3 0 3	AAOC C312	Operations Research	3 0 3
EEE C272	Circuits & Signals	3 0 3	AAOC C321	Control Systems	3 0 3
ES C112	Thermodynamics	3 0 3	AAOC C322	Systems	3 0 3
ES C221	Mechanics of Solids	3 0 3	AAOC C341	Numerical Analysis	3 0 3
ES C232	Transport Phenomena I	3 0 3	BIO C391	Instrumental Methods of Analysis	4
ES C241	Electrical Sciences I	3 0 3			
ES C242	Structure and Properties of Materials	3 0 3			

MGTS C233	Principles of Marketing for Engineers	3 0 3	BITS C386	Quantum Information and Computation	3 0 3
PHIL C211	Introductory Philosophy	3 0 3	BITS C393	Current Affairs	3 0 3
PHIL C221	Symbolic Logic	3 0 3	BITS C394	Mass Media Content and Design	3 0 3
POL C211	Indian National Movement	3 0 3	BITS C395	Short Film and Video Production	3 0 3
POL C212	Modern Political Concepts	3 0 3	BITS C396	Reporting and Writing for Media	3 0 3
POL C311	Gandhian Thoughts	3 0 3	BITS C397	Techniques in Social Research	3 0 3
POL C312	Marxian Thoughts	3 0 3	BITS C398	Creative Multimedia	2 2 3
POL C321	International Relations	3 0 3	BITS C432	Entrepreneurship	3 0 3
PSY C211	Introduction Psychology	3 0 3	BITS C461	Software Engineering	3
PSY C311	Psychology of Human Adjustment	3 0 3	BITS C462	Renewable Energy	3 0 3
SOC C211	Dynamics of Social Change	3 0 3	BITS C463	Cryptography	3 0 3
B. Other Courses			BITS C464	Machine Learning	3 0 3
BIO C231	Biology Project Laboratory	3	BITS C471	Management Information Systems	3 0 3
BITS C224	Corporate Taxation	3 0 3	BITS C472	e-Business	3 0 3
BITS C313	Lab. Oriented Project	3	BITS C473	Nonlinear Dynamics and Chaos	3 0 3
BITS C314	Lab. Oriented Project	3	BITS C474	Rural Infrastructure Planning	3 0 3
BITS C323	Study Oriented Project	3	BITS C481	Computer Networks	3 0 3
BITS C324	Study Oriented Project	3	BITS C482	Creating and Leading Entrepreneurial	3 0 3
BITS C331	Computer Projects	3	BITS C483	Indian Wisdom for Modern Management	3 0 3
BITS C332	Culture and Significance of Modern Mathematics	3 0 3	BITS C484	Introduction to Conflict Management	3 0 3
BITS C333	Project on Organisational Aspects	3	BITS C485	Marketing Audit	3 0 3
BITS C334	Project on Organisational Aspects	3	BITS C486	Product & Brand Management	3 0 3
BITS C335	Computer Projects	3	BITS C487	Global Business, Technology & Knowledge Sharing	3 0 3
BITS C341	Selected Computer Languages	3	BITS C488	Services Management Systems	3 0 3
BITS C342	Object Oriented Programming	3 0 3	BITS C489	Enterprise Resource Planning	3 0 3
BITS C372	Data Communications and Networks	3 0 3	CHEM C212	Colloid and Surface Chemistry	3 0 3
BITS C381	TIC Projects	3			
BITS C382	Reading Course	3			
BITS C383	TIC Projects	3			
BITS C385	Introduction to Gender Studies	3 0 3			

CHEM C231	Chemistry Project Laboratory	3	EA C413	Intelligent Manufacturing System	3 0 3
MATH C231	Number Theory	3 0 3	EA C414	Introduction to Bioinformatics	3 0 3
PHY C231	Physics Project Laboratory	3	EA C415	Introduction to MEMS	4
PHY C232	Computational Physics	3 0 3	EA C416	Introduction to Nanoscience	3 0 3
PHY C241	Atmospheric Physics	3 0 3	EA C422	Fibre Optics and Optoelectronics	3
PHY C242	Theory of Relativity	3 0 3	EA C441	Robotics	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.			EA C442	Remote Sensing and Image Processing	3
CDP C211	Agricultural Growth of India	3 0 3	EA C443	Image Processing	3 0 3
CDP C212	Industrial Growth of India	3 0 3	EA C451	Internetworking Technologies	3 0 3
CDP C221	Growth of Social Health in India	3 0 3	EA C452	Mobile Telecommunication Networks	3 0 3
CDP C231	Transport & Communication	3 0 3	EA C461	Artificial Intelligence	3
CDP C313	Security Analysis & Portfolio Management	3 0 3	EA C462	Superconductivity Theory and Applications	3 0 3
CDP C323	Functions & Working of Stock Exchanges	3 0 3	EA C463	Neural Networks and Applications	3 0 3
CDP C332	Contemporary India	3 0 3	EA C471	Pattern Recognition	3
CDP C364	Industrial Relations	3 0 3	EA C472	Photovoltaic Devices	3 0 3
CDP C371	Development Economics	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 C481	Expert Systems	3
			EA C482	Fuzzy Logic and Applications	3 0 3

(viii) Electives

While Table on page IV-7 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 take normally four additional courses as optional electives. In special cases Clause 1.08 Committee may also 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:

Emerging Area Courses

EA C342	Computer Aided Design	3
EA C412	Flexible Manufacturing Systems	3 2 4

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 named 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 named 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.

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:

BITS C211	Introduction to IPR	1
BITS C212	Introduction to Human Rights	1
BITS C213	Introduction to Environmental Studies	1
BITS C317	Managerial Skills	1 0 1
BITS C318	Workshop on Film Production	1
BITS C319	Negotiation Skills and Techniques	2 0 2

(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
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*
MUSIC N214T	Indian Classical Music (Instrumental) IV	3*
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 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).

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

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 OR Thesis & Seminar	25 OR 16	2 OR 2	25 OR 16	2 OR 2
Total	140 (Min)	44 (Min.)	140 (Min.)	44 (Min.)

Pattern I 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 (For Civil, Mech.)
	BIO	C211	Biological Chemistry (For Bio, BIOT, Pharm)	ME	C212	
	BIO	C241	Microbiology (For Bio, BIOT)	CHE	C213	Fluid Flow Operations (For Che)
	ECON	C212	Principles of Economics (For Econ, Pharm)	CE	C241	Analysis of Structures (For Civil)
	ES	C221	Mechanics of Solids (For Engg)	CHE	C221	Chemical Process Calculations (For Che)
	MGTS	C211	Principles of Management (Exptl Sc, Math, BIOT)	CHEM	C211	Atomic & Molecular Structures (For Chem)
	PHA	C241	Microbiology (For Pharm)	CHEM	C232	Chemistry of Organic Compounds (For Chem, Pharm)
	PHY	C221	Modern Physics (For Phy)	ECON	C211	Fundamentals of Finance & Accounting (For Econ)
	SOC	C211	Dynamics of Social Change (For Econ)	EEE	C272	Circuits & Signals (For EEE, ECE, EI)
	TA	C211	Measurement Techniques I (For Econ, Engg, Exptl Sc, Math, Pharm)	ECE	C272	
	TA	C211	Measurement Techniques I (For Econ, Engg, Exptl Sc, Math, Pharm)	INSTR	C272	
	TA	C312	Technical Report Writing (For Engg, except BIOT)	ES	C263	Microprocessor Programming & Interface- in (For CS, EEE, ECE, EI)
	Elective	1	(For Chem, Math)	MATH	C222	Discrete Structures for Computer Science (For CS)
				ME	C211	Applied Thermodynamics (For ME, MF)
				MF	C211	
			MGTS	C211	Principles of Management (For Econ, Engg, Pharm)	
			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) Exptl Sc, Math, Pharm)	
			BIOT	C216	Introductory Molecular Biology (For BIOT)	
			Elective	1	(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., CS)
	AAOC	C311	Data Processing (For Econ, Math)	AAOC	C341	Numerical Analysis (For Che, EEE, ECE, EI, Exptl. Sc., Math)
	AAOC	C321	Control Sys. (For Che, EEE, ECE, EI)	Elective	1	(For Econ, Pharm)
	AAOC	C341	Numerical Analy.(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
		6	(For BIOT, Chem, Econ, Engg, Math, Phy)	OR		
				BITS	C422T-	Thesis
			BITS	C442T	Seminar	

Note : This is currently operative pattern 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, Pharm) BIO C241 } Microbiology (For Bio, 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 Che, Chem, Civil, CS, EEE, ECE, EI, 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, EI, Exptl Sc., Math) CE C212 } Transport Phenomena I (For Civil, Mech) ME 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 } Circuits & Signals (For EEE, ECE, EI) ECE C272 } 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) PHA C212 Pharmaceutical Analysis (For Pharm) TA C222 Measurement Techniques II (For Econ, Engg, Exptl Sc, Math) Elective 1 (For 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, EEE, EI) AAOC C341 Numerical Analysis (For Civil, Mech.,MF,CS) BIO C391 } Instrumental Methods of Analysis (For Exptl Sc, Pharm) CHEM C391 } PHA C391 } PHY C391 } Elective 1 (For Che, Civil, CS, EEE, ECE, EI, Mech, MF, Pharm) Electives 2 (For 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 currently operative pattern 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 B.Pharm (Hons.) Programme in First Semester with PCB input								
Year	First Semester			U	Second Semester			U
I	BIO	C111	General Biology	3	AAOC	C111	Probability & Statistics	3
	CHEM	C141	Chemistry-I	3	CHEM	C142	Chemistry-II	3
	ES	C112	Thermodynamics	3	MATH	C191	Mathematics I	3
	MATH	D021	Remedial Mathematics	5	PHY	C132	Physics-II	3
	PHY	C131	Physics-I	3	TA	C112	Workshop Practice	4
	TA	C111	Engineering Graphics	4	TA	C162	Computer Programming I	3
				21				19
II	ECON	C212	Principles of Economics	3	MATH	C241	Mathematics III	3
	ES	C241	Electrical Sciences I	3	ES	C242	Structure & Properties of Materials	3
	MATH	C192	Mathematics II	3	PHA	C212	Pharmaceutical Analysis	3
	TA	C211	Measurement Techniques I	2	ES	C272	Electrical Sciences II	3
	TA	C252	Computer Programming II	3	MGTS	C211	Principles of Management	3
	BIO	C211	Biological Chemistry	3	TA	C312	Technical Report Writing	3
	PHA	C241	Microbiology	3	CHEM	C232	Chemistry of Organic Compounds	3
				21				21
BITS C221 Practice School I 5 Units (For PS Option Only)								
Summer								
III	PHA	C311	Natural Drugs	3	PHA	C312	Forensic Pharmacy	3
	PHA	C321	Anatomy Physiology & Hygiene	3	PHA	C421	Pharmaceutical Formulation and Biopharmaceutics	3
	PHA	C331	Industrial Pharmacy	3	PHA	C332	Pharmacology & Toxicology	3
	PHA	C322	Dispensing Pharmacy	3	PHA	C342	Medicinal Chemistry	3
	AAOC	C222	Optimization	3	AAOC	C312	Operations Research Elective 1	3
	PHA	C391	Instrumental Methods of Analysis	4				
				19				18
IV	Electives 5			15	BITS	C412	Practice School II	20
					OR			
					BITS	C422T	Thesis	15
				BITS	C442T	Seminar	1	
			15				20/16	

Note: a. The Units mentioned for Electives are minimum units and in actual cases they may be more, depending upon the nature of the course.

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

Pattern 2 Semester-wise Pattern for Students Admitted to B.Pharm (Hons.) Programme in Second Semester with PCB input								
Year	First Semester			U	Second Semester			U
I					BIO C111	General Biology	3	
					CHEM C141	Chemistry-I	3	
				TA C162	Computer Programming I	3		
				MATH D021	Remedial Mathematics	5		
				PHY C131	Physics-I	3		
				TA C112	Workshop Practice	4		
				19				21
II	MATH C191	Mathematics I	3	MATH C192	Mathematics II	3		
	CHEM C142	Chemistry-II	3	AAOC C111	Probability & Statistics	3		
	ES C112	Thermodynamics	3	ES C242	Structure & Properties of Materials	3		
	PHY C132	Physics-II	3	MGTS C211	Principles of Management	3		
	TA C111	Engineering Graphics	4	TA C312	Technical Report Writing	3		
	TA C252	Computer Programming II	3		Elective (1)	3		
					19			
III	MATH C241	Mathematics III	3	PHA C212	Pharmaceutical Analysis	3		
	AAOC C222	Optimization	3	ES C272	Electrical Sciences II	3		
	ECON C212	Principles of Economics	3	AAOC C312	Operations Research	3		
	TA C211	Measurement Techniques I	2	CHEM C232	Chemistry of Organic Compounds	3		
	ES C241	Electrical Sciences I	3		Elective (2)	6		
	PHA C241	Microbiology	3					
	BIO C211	Biological Chemistry	3					
				20				18
BITS C221 Practice School I 5 Units (For PS Option Only)								
IV	PHA C311	Natural Drugs	3	PHA C312	Forensic Pharmacy	3		
	PHA C321	Anatomy Physiology & Hygiene	3	PHA C421	Pharmaceutical Formulation and Biopharmaceutics	3		
	PHA C331	Industrial Pharmacy	3	PHA C332	Pharmacology & Toxicology	3		
	PHA C322	Dispensing Pharmacy	3	PHA C342	Medicinal Chemistry	3		
	PHA C391	Instrumental Methods of Analysis	4		Elective (2)	6		
				3				
				19				18
V	BITS C412	Practice School II	20					
	OR							
	BITS C422T	Thesis	15					
	BITS C442T	Seminar	1					
				20/16				

Note: a. The Units mentioned for Electives are minimum units and in actual cases they may be more, depending upon the nature of the course.

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

Pattern 1 Semester-wise Pattern for Students Admitted to M.Sc. (Hons.) Biological Science Programme in First Semester with PCB input										
Year	First Semester				U	Second Semester				U
I	BIO	C111	General Biology	3	AAOC	C111	Probability & Statistics	3		
	CHEM	C141	Chemistry-I	3	CHEM	C142	Chemistry-II	3		
	ES	C112	Thermodynamics	3	MATH	C191	Mathematics I	3		
	MATH	D021	Remedial Mathematics	5	PHY	C132	Physics-II	3		
	PHY	C131	Physics-I	3	TA	C112	Workshop Practice	4		
	TA	C111	Engineering Graphics	4	TA	C162	Computer Programming I	3		
				21						19
II	ES	C241	Electrical Sciences I	3	MATH	C241	Mathematics III	3		
	MATH	C192	Mathematics II	3	ES	C242	Structure & Properties of Materials	3		
	TA	C211	Measurement Techniques I	2						
	TA	C252	Computer Programming II	2	ES	C272	Electrical Sciences II	3		
	BIO	C211	Biological Chemistry	3	TA	C222	Measurement Techniques II	4		
	MGTS	C211	Principles of Management	3	TA	C312	Technical Report Writing Elective (1)	3		
				3						3
				20						19
BITS C221 Practice School I 5 Units (For PS Option Only)										
Summer										
III	BIO	C321	Cell Biology	3	BIO	C312	Developmental Biology	3		
	BIO	C331	Biophysics	3	BIO	C322	Ecology	3		
	BIO	C342	General Physiology	3	BIO	C332	Genetics	3		
	AAOC	C222	Optimization	3	BIO	C411	Laboratory	3		
	AAOC	C312	Operation Research Elective (2)	3	AAOC	C341	Numerical Analysis	3		
					6	BIO	C391	Instrumental Methods of Analysis	4	
				21						19
IV	Electives 5				15	BITS	C412	Practice School II		20
						OR				
						BITS	C422T	Thesis		15
					BITS	C442T	Seminar		1	
				15						20/16

Note: a. The Units mentioned for Electives are minimum units and in actual cases they may be more, depending upon the nature of the course.

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

Pattern 2 Semester-wise Pattern for Students Admitted to M.Sc. (Hons.) Biological Science Programme in Second Semester with PCB input								
Year	First Semester			U	Second Semester			U
I					BIO C111	General Biology	3	
					CHEM C141	Chemistry-I	3	
				TA C162	Computer Programming I	3		
				MATH D021	Remedial Mathematics	5		
				PHY C131	Physics-I	3		
				TA C112	Workshop Practice	4		
				19				21
II	MATH C191	Mathematics I	3	MATH C192	Mathematics II	3		
	CHEM C142	Chemistry-II	3	AAOC C111	Probability & Statistics	3		
	ES C112	Thermodynamics	3	ES C242	Structure & Properties of Materials	3		
	PHY C132	Physics-II	3	MGTS C211	Principles of Management	3		
	TA C111	Engineering Graphics	4	TA C312	Technical Report Writing	3		
	TA C252	Computer Programming II	3		Elective (1)	3		
					19			
III	MATH C241	Mathematics III	3	ES C272	Electrical Sciences II	3		
	AAOC C222	Optimization	3	AAOC C312	Operations Research	3		
	TA C211	Measurement Techniques I	2	AAOC C341	Numerical Analysis	3		
	ES C241	Electrical Sciences I	3	TA C222	Measurement Techniques II	4		
	BIO C241	Microbiology	3		Elective (2)	6		
	BIO C211	Biological Chemistry	3					
		Elective (1)	3					
				20				19
BITS C221 Practice School I 5 Units (For PS Option Only)								
IV	BIO C321	Cell Biology	3	BIO C312	Developmental Biology	3		
	BIO C331	Biophysics	3	BIO C322	Ecology	3		
	BIO C342	General Physiology	3	BIO C332	Genetics	3		
	Elective (3)			9	BIO C411	Laboratory	3	
					BIO C391	Instrumental Methods of Analysis	4	
						Elective (1)	3	
				18				19
V	BITS C412	Practice School II	20					
	OR							
	BITS C422T	Thesis	15					
	BITS C442T	Seminar	1					
				20/16				

Note: a. The Units mentioned for Electives are minimum units and in actual cases they may be more, depending upon the nature of the course.

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

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		PHIL C221	Symbolic Logic (for IS)	
				SOC C211	Dynamics of Social Change (for IS, Fin.)	
				HUM C351	Public Administration (for Fin.)	
				TOC C224	Corporate Taxation (for Fin.)	
				Elective (s)	1 (for ET, IS)	
III	ECON C212	Principles of Economics		AAOC C312	Operations Research (for ET, Fin.)	
	ENGG C241	Mechanical Technology (for ET, IS)		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.)	
	HSS C241	Legal Environment of Business (For Fin.)		Elective(s)	2 (for ET, IS, Fin)	
	TA C231	Business Communication (for Fin.)				
	Elective(s)	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.)	
	BITS C342	Object oriented programming (for IS)		Elective(s)	1 (for ET, IS)	
	CDP C323	Functions and Working of Stock Exchanges (for Fin.)		Elective(s)	2 (for Fin.)	
	Elective(s)	1 (for ET, IS, Fin)				
V	BITS C412	Practice School II				
		OR				
	BITS C422T	Thesis				
	BITS C422T	Seminar				

Note: This is currently operative pattern 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 Semesterwise Pattern for Students Admitted to Group C: 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		
	ENGL C121 English Language Skills I	3	MATH C192 Mathematics II	3		
	MATH C191 Mathematics I	3	PSY C211 Introductory Psychology	3		
	PHY C122 General Physics	3	TA C112 Workshop Practice	4		
	TA C111 Engineering Graphics	4	TA C162 Computer Programming I	3		
			19		19	
II	ECON C212 Principles of Economics	3	AAOC C311 Data Processing	3		
	ENGG C212 Introduction to Systems	3	MGTS C211 Principles of Management	3		
	ENGL C251 Linguistics	3	PHIL C221 Symbolic Logic	3		
	HSS C241 Legal Environment of Business	3	POL C212 Modern Political Concepts	3		
	TA C252 Computer Programming II	3	SOC C211 Dynamics of Social Change	3		
	ENGL C122 English Language Skills II	3	TA C312 Technical Report Writing	3		
			18		18	
BITS C221 Practice School I 5 Units (For PS Option Only)						
III	AAOC C222 Optimization	3	AAOC C312 Operations Research	3		
	CDP C371 Development Economics	3	CDP C332 Contemporary India	3		
	HIST C112 Main Trends in Indian History	3	HUM C412 Heritage of India	3		
	HUM C351 Public Administration	3	PHIL C211 Introductory Philosophy	3		
	ENGL C353 Effective Public Speaking	3	Elective(s) 2	6		
	Elective(s) 1	3				
			18		18	
IV	Elective(s) 6	18	BITS C412 Practice School II	20		
			OR			
			BITS C422T Thesis	15		
			BITS C442T Seminar	1		
		18		20/16		

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

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	
							19	
II	CHEM C221	General Chemistry	3	HUM C351	Public Administration	3		
	ENGG C111	Electrical & Electronics Technology	3	MATH C192	Mathematics II	3		
	ENGL C121	English Language Skills I	3	MGTS C211	Principles of Management	3		
	PHY C122	General Physics	3	POL C212	Modern Political Concepts	3		
	TA C112	Workshop Practice	4	SOC C211	Dynamics of Social Change	3		
	TA C252	Computer Programming II	3	Elective(s) 1		3		
							18	
III	CDP C371	Development Economics	3	AAOC C311	Data Processing	3		
	ECON C212	Principles of Economics	3	AAOC C312	Operations Research	3		
	ENGG C212	Introduction to Systems	3	CDP C332	Contemporary India	3		
	ENGL C122	English Language Skills II	3	PHIL C211	Introductory Philosophy	3		
	HSS C241	Legal Environment of Business	3	TA C312	Technical Report Writing	3		
	ENGL C251	Linguistics	3	Elective(s) 1		3		
						18		
Summer BITS C221 Practice School-I 5 Units (For PS Option only)								
IV	AAOC C222	Optimization	3	Elective(s) 6			18	
	HIST C112	Main Trends in Indian History	3					
	HUM C412	Heritage of India	3					
	PHIL C221	Symbolic Logic	3					
	ENGL C353	Effective Public Speaking	3					
	Elective(s) 1		3					
						18		
V	BITS C412	Practice School II	20					
		OR						
	BITS C422T	Thesis	15					
	BITS C442T	Seminar	1					
			20/16					

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

(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
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 C414	Genetic Engineering	1 6 3
BIO C416	Immunology	3 0 3
BIO C417	Biomolecular Modeling	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 T332	Genetics ¹	3 0 3
# BIO T336	Cell Physiology ¹	3 0 3
# BIO T337	Industrial Microbiology & Bioprocess Engineering ¹	2 3 4
# BIO T338	Introduction to Environmental Biotechnology ²	3 0 3
# BIO T339	Biophysical Chemistry ²	3 0 3
BIO T343	Genomics	3 0 3
BIO T344	Proteomics	3 0 3
BIO T345	Immunotechnology	3 0 3
# BIO T346	Experiments in Biotechnology	9 3
BIO T413	Molecular Biology of Cell	3 0 3
# BIO T414	Genetic Engineering ¹	1 6 3
BIO T416	Immunology	3 0 3
BIO T417	Biomolecular Modeling	3 0 3
# BIO T461	Recombinant DNA Technology ²	3 0 3
BIO T491	Special Projects	3
EA C414	Introduction to Bioinformatics	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	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
CHEM C312	Chemistry of Nontransitional Elements	3 0 3
# CHEM C321	Chemical Thermodynamics ¹	3 0 3
# CHEM C322	Quantum Chemistry ¹	3 0 3
# CHEM C331	Structure and Reactivity of Organic Compounds ¹	3 0 3
# CHEM C332	Synthetic Organic Chemistry ²	3 0 3
* CHEM C341	Biophysical Chemistry	3 0 3
CHEM C342	Coordination Chemistry	3 0 3
* CHEM C351	Computational Chemistry	3 3 4
# CHEM C352	Bonding in Inorganic Compounds ²	3 0 3
* CHEM C361	Polymer Chemistry	3 0 3
* CHEM C362	Chemistry of Inorganic Compounds	3 0 3
# CHEM C411	Chemical Experimentation ²	0 9 3
CHEM C412	Photochemistry and Laser Spectroscopy	3 0 3
CHEM C421	Theoretical Inorganic Chemistry	3 0 3
* CHEM C422	Statistical Thermodynamics	3 0 3
* CHEM C431	Stereochemistry and Reaction Mechanisms	3 0 3
CHEM C441	Biochemical Engineering	3 0 3
CHEM C451	Physical Pharmacy	2 3 3
CHEM C461	Nuclear & Radiochemistry	3 0 3
CHEM C491	Special Projects	3

1 Compulsory Discipline Course normally offered in First Semester.

2 Compulsory Discipline Course normally offered in Second Semester.

Civil Engineering

# CE C322	Construction Planning and Technology ²	3 0 3
# CE C342	Water and Waste Water Treatment ²	3 2 4
# CE C361	Soil Mechanics and Foundation Engineering ¹	3 2 4
# CE C371	Hydraulics and Fluid Mechanics ¹	3 2 4
# CE C381	Design of Steel Structures ¹	3 0 3
# CE C383	Design of Concrete Structures ²	3 2 4
# CE C391	Transportation Engineering ²	3 2 4
# CE C392	Geodesy ¹	3 2 4
CE C411	Transportation Engineering	3 0 3
CE C412	Disaster Management	3 0 3
CE C414	Introduction to Environmental Engineering	3 0 3
CE C415	Design of Prestressed Concrete Structures	3 0 3
CE C416	Computer Application in Civil Engineering	3 2 4
CE C417	Applications of Artificial Intelligence in Civil Engineering	3 0 3
CE C418	Introduction to Water Resources Engineering	3 0 3
CE C419	Geotechnical Earthquake Engineering and Machine Foundation	3 0 3
CE C422	Design of Bridge Structures	3 0 3
CE C432	Structural Dynamics	3 0 3
CE C441	Design of Water Resources Systems	3 0 3
CE C461	Refrigeration and Air Conditioning	3 0 3
CE C471	Introduction to Finite Element Methods	3 0 3
CE C491	Special Projects	3

Computer Science

CS C321	Computers and Programming	3 2 4
# CS C341	Data Structures and Algorithms ¹	3 0 3
# CS C342	Advanced Computer Organization ²	3 0 3
# CS C351	Theory of Computation ¹	3 0 3
# CS C352	Data Base Systems ²	3 0 3
# CS C362	Programming Languages & Compiler Construction ²	3 0 3
# CS C372	Operating Systems ¹	3 0 3
# CS C391	Digital Electronics and Computer Organization ¹	3 3 4
CS C414	Telecommunication Switching Systems & Networks	3 0 3
CS C415	Data Mining	3 0 3
CS C422	Parallel Computing	3 0 3
CS C424	Software for Embedded Systems	3 0 3
CS C441	Selected Topics from Computer Science	3
CS C442	Advanced Algorithms & Complexity	3 0 3
CS C444	Real-Time Systems	3 0 3

CS C446	Data Storage Technologies and Networks	3 0 3
CS C451	Combinatorial Mathematics	3 0 3
CS C453	Discrete Mathematical Structures	3 0 3
# CS C461	Computer Networks ²	3 0 3
CS C471	Computer Graphics	2 2 3
CS C481	Graphical User Interfaces	3 0 3
CS C491	Special Projects	3

Economics

# ECON C311	Microeconomics ¹	3 0 3
# ECON C321	Macroeconomics ¹	3 0 3
# ECON C322	Public Finance: Theory and Practice ²	3 0 3
# ECON C341	Economics of Growth & Planning ¹	3 0 3
# ECON C342	Econometrics ²	3 0 3
# ECON C362	Money, Banking and Financial Markets ²	3 0 3
# ECON C372	International Trade and Balance of Payments ²	3 0 3
ECON C411	Project Appraisal	3 0 3
ECON C412	Security Analysis & Portfolio Management	3 0 3
ECON C422	Functions & Working of Stock Exchanges	3 0 3
ECON C431	Regional Economics	3 0 3
ECON C436	Strategic Financial Management	3 0 3
ECON C451	Technology Forecasting	3 0 3
ECON C461	Analysis of Indian Economy	3 0 3
ECON C471	Resources and Environmental Economics	3 0 3
ECON C481	Financial Management	3 0 3
ECON C491	Special Projects	3

Electrical & Electronics Engineering

CS C341	Data Structures & Algorithms	3 0 3
# EEE C364	Analog Electronics ²	3 3 4
# EEE C371	Electromechanical Energy Conversion ¹	3 3 4
* EEE C374	Power Systems	3 0 3
# EEE C381	Electronic Devices & Integrated Circuits ¹	3 0 3
# EEE C383	Communication Systems ²	3 3 4
# EEE C391	Digital Electronics and Computer Organization ¹	3 3 4
* EEE C414	Telecommunication Switching Systems & Networks	3 0 3
EEE C415	Digital Signal Processing	3 0 3
EEE C416	Digital Communication	3 0 3
EEE C417	Computer Based Control Systems	3 0 3
EEE C418	Digital Systems	3 0 3

1 Compulsory Discipline Course normally offered in First Semester.

2 Compulsory Discipline Course normally offered in Second Semester.

EEE C422	Modern Control Systems	3 0 3	# INSTR C381	Transducers & Measurement Systems ¹	3 0 3
EEE C423	Combinatorial Mathematics	3 0 3	# INSTR C391	Digital Electronics and Computer Organization ¹	3 3 4
# EEE C424	Microelectronic Circuits ¹	3 0 3	* INSTR C392	Analysis Instrumentation	3 0 3
EEE C432	Medical Instrumentation	3 0 3	INSTR C411	Opto-Electronic Instruments	3 0 3
* EEE C433	Electromagnetic Fields & Waves	3 0 3	INSTR C414	Telecommunication Switching Systems & Networks	3 0 3
EEE C441	Television Engineering	3 0 3	INSTR C421	Digital Systems	3 0 3
* EEE C443	Analog & Digital VLSI Design	3 0 3	INSTR C444	Real-Time Systems	3 0 3
EEE C444	Real-Time Systems	3 0 3	* INSTR C451	Process Control	3 0 3
EEE C452	Electromagnetic Fields & Microwave Engineering	3 0 3	* INSTR C461	Power Electronics	3 0 3
EEE C453	Discrete Mathematical Structures	3 0 3	* INSTR C471	Electronic Measurements and Instrumentation	3 0 3
* EEE C461	Power Electronics	3 0 3	INSTR C481	Medical Instrumentation	3 0 3
EEE C462	Advanced Power Systems	3 0 3	INSTR C491	Special Projects	3
EEE C471	Electronic Measurements and Instrumentation	3 0 3			
EEE C472	Satellite Communication	3 0 3			
EEE C491	Special Projects	3			
Electronics & Communication Engineering					
CS C341	Data Structures and Algorithms	3 0 3	# ET C341	Instrumentation and Control ¹	3 0 3
CS C461	Computer Networks	3 0 3	# ET C342	Materials Management ²	3 0 3
EA C473	Multimedia Computing	3 0 3	# ET C351	Chemical Process Technology ²	3 0 3
#ECE C313	Microelectronic Circuits ¹	3 0 3	# ET C352	Energy Management ²	3 0 3
#ECE C364	Analog Electronics ²	3 3 4	# ET C362	Environmental Pollution Control ²	3 0 3
#ECE C383	Communication Systems ¹	3 3 4	ET C411	Concepts of Engineering Design	3
#ECE C391	Digital Electronics and Computer Organization ¹	3 3 4	# ET C412	Production Planning & Control ¹	3 0 3
#ECE C392	Modern Communication Technologies ¹	3 0 3	ET C413	Advances in Materials Science	3 0 3
#ECE C393	Information Theory & Coding ²	3 0 3	# ET C414	Project Appraisal ¹	3 0 3
#ECE C394	Communication Networks ²	3 0 3	ET C421	Computer Aided Project Planning and Monitoring	3
#ECE C452	Electromagnetic Fields & Microwave Engineering ¹	3 0 3	ET C422	Computer Aided Manufacturing	3 0 3
ECE C491	Special Projects	3	ET C431	Technology Forecasting	3 0 3
EEE C414	Telecommunications Switching Systems and Networks	3 0 3	ET C432	Quality Control, Assurance & Reliability	3 0 3
EEE C415	Digital Signal Processing	3 0 3	ET C441	Technology Management	3 0 3
EEE C416	Digital Communication	3 0 3	ET C491	Special Projects	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	# FIN C312	International Financial Markets and Services ²	3 0 3
# INSTR C312	Industrial Instrumentation and Control ²	3 0 3	# FIN C321	Theory of Finance ¹	3 0 3
# INSTR C313	Microelectronic Circuits ¹	3 0 3	# FIN C322	Project Finance ²	3 0 3
# INSTR C355	Electronic Instruments and Instrumentation Technology ²	3 3 4	FIN C331	Management Accounting	3 0 3
# INSTR C364	Analog Electronics ²	3 3 4	# FIN C332	Econometrics ²	3 0 3
* INSTR C371	Electromechanical Energy Conversion	3 3 4	# FIN C341	Investment Banking and Financial Services ¹	3 0 3
			# FIN C342	Financial Management ¹	3 0 3
			FIN C411	Project Appraisal	3 0 3
			FIN C413	Risk Management and Insurance	3 0 3
			FIN C421	Financing International Trade	3 0 3
			FIN C422	Public Finance: Theory and Practice	3 0 3
			FIN C424	Money Banking and Financial Markets	3 0 3
			FIN C431	Marketing	3 0 3

1 Compulsory Discipline Course normally offered in First Semester.

2 Compulsory Discipline Course normally offered in Second Semester.

FIN C432 Issues in Indian Economy	3 0 3	MATH C421 Combinatorial Mathematics	3 0 3
FIN C433 Advertising & Sales Promotion	3 0 3	MATH C422 Algebraic & Differential Topology	3 0 3
FIN C436 Strategic Financial Management	3 0 3	MATH C431 Distribution Theory	3 0 3
FIN C441 Organisational Behaviour	3 0 3	MATH C441 Discrete Mathematical Structures	3 0 3
FIN C442 Corporate Planning	3 0 3	MATH C451 Ordinary Differential Equations	3 0 3
FIN C451 International Business	3 0 3	MATH C452 Partial Differential Equations	3 0 3
FIN C462 Services Marketing	3 0 3	MATH C461 Integral Equations	3 0 3
FIN C491 Special Projects	3	MATH C471 Non-Linear Optimisation	3 0 3
Information Systems		MATH C481 Commutative Algebra	3 0 3
IS C311 Computer Concepts and Software Systems	3 0 3	MATH C491 Special Projects	3
IS C321 Program, Data & File Structures	3 0 3	Manufacturing Engineering	
# IS C332 Database Systems and Applications ²	3 0 3	#MF C312 Design of Machine Elements ¹	3 0 3
# IS C341 Software Engineering ²	3	#MF C313 Kinematics and Dynamics of Machines ¹	3 0 3
# IS C342 Structures of Programming Languages ²	3 0 3	#MF C314 Metal Forming and Machining ¹	3 2 4
# IS C351 Computer Organization and Architecture ¹	3 2 4	#MF C315 Casting and Welding ²	3 2 4
IS C352 Management Information Systems	3 0 3	#MF C316 Manufacturing Management ¹	3 0 3
# IS C361 Data Structures and Algorithms ¹	3 0 3	MF C317 Instrumentation and Control	3 0 3
# IS C362 Operating Systems ¹	3 0 3	MF C318 Design of Machine Tools	3 0 3
IS C411 Information Systems Project	3	#MF C319 Mechatronics and Automation ²	3 0 3
IS C415 Data Mining	3 0 3	MF C321 Mechanical Engineering Drawing	3 0 3
IS C421 Modelling and Decision Systems	3 0 3	MF C343 Maintenance and Safety	3 0 3
IS C422 Parallel Computing	3 0 3	#MF C382 Computer Aided Design ²	3*
IS C424 Software for Embedded Systems	3 0 3	#MF C411 Tool and Fixture Design ²	3 0 3
IS C431 Educational Software	1 4 3	MF C412 Automotive Systems	3 0 3
IS C444 Real Time Systems	3 0 3	MF C413 Mechanical Vibrations and Acoustics	3 0 3
IS C446 Data Storage Technologies and Networks	3 0 3	MF C414 Manufacturing Excellence	3 0 3
# IS C461 Computer Networks ²	3 0 3	MF C415 Noise Engineering	3 0 3
IS C462 Network Programming	3 0 3	MF C416 Work System Design	3 0 3
IS C471 Computer Graphics	2 2 3	MF C417 Internal Combustion Engines	3 0 3
IS C472 Geographical Information Systems	3 0 3	MF C418 Lean Manufacturing	3 0 3
IS C481 Graphical User Interfaces	3 0 3	MF C421 Supply Chain Management	4*
Mathematics		MF C432 Computer Aided Manufacturing	3 0 3
# MATH C311 Algebra I ¹	3 0 3	MF C441 Quality Control Assurance and Reliability	3 0 3
# MATH C312 Algebra II ²	3 0 3		
# MATH C321 Elementary Real Analysis ¹	3 0 3		
# MATH C322 Measure and Integration ²	3 0 3		
# MATH C331 Introduction to Topology ¹	3 0 3		
# MATH C332 Introduction to Functional Analysis ²	3 0 3		
# MATH C352 Differential Geometry ²	3 0 3		
MATH C353 Statistical Inference and Applications	3 0 3		
MATH C411 Complex Analysis	3 0 3		
MATH C412 Concepts of Geometry	3 0 3		
MATH C413 Topological Groups	3 0 3		

1 Compulsory Discipline Course normally offered in First Semester.

2 Compulsory Discipline Course normally offered in Second Semester.

(x) 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 Circuits & Signals (for EEE) INSTR C272 Circuits & Signals (for EI) 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, Math., Phy.) 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	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., Econ.) Elective 1 First Degree Compulsory Discipline Courses*
IV	Second Degree Compulsory Discipline Courses* AAOC C321 Control Systems (For B to Che, EEE, ED) AAOC C341 Numerical Analysis (For B to Civil, ME, MF, CS) Electives 2 Elective 1 (For CS)	Second Degree Compulsory Discipline Courses* AAOC C341 Numerical Analysis (For B to Che, EEE, ED) 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 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	ES	C242	Structure and Properties of Materials
	ECON	C212	Principles of Economics	ES	C272	Electrical Sciences II
	ES	C241	Electrical Sciences I	CHEM	C232	Chemistry of Organic Compounds (For Bio, Chem, Math, Phy)
	PHY	C221	Modern Physics (For Phy)	MGTS	C211	Principles of Management
	MATH	C241	Mathematics III	TA	C222	Measurement Techniques II
	TA	C211	Measurement Techniques I	TA	C312	Technical Report Writing
	TA	C252	Computer Programming II	CHEM	C211	Atomic & Molecular Structure (For Chem)
	BIO	C241	Microbiology (For Bio)	SOC	C211	Dynamics of Social Change (For Econ)
	PHA	C241	Microbiology (For Chem, Econ, Math, Phy)	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	AAOC	C222	Optimization	AAOC	C312	Operation Research
	AAOC	C311	Data Processing (For Econ. Math)	AAOC	C341	Numerical Analysis (For Math. Exptl.Sc.)
	AAOC	C221	Graphs and Networks (For Math)	PHA	C212	Pharmaceutical Analysis (For CHEM, Math, Econ)
	PHY	C212	Classical Mechanics (For Phy)	CHEM	C232	Chemistry of Organic Compounds (For Econ)
	PHA	C391	Instrumental Methods of Analysis	First Degree Compulsory Discipline Courses*		
	First Degree Compulsory Discipline Courses*			First Degree Compulsory Discipline Courses*		
	Elective	1				
IV	Second Degree Compulsory Discipline Courses* Electives 3			Second Degree Compulsory Discipline Courses* Electives 2		
V	BITS	C413	Practice School II OR	BITS	C422T	Thesis
	BITS	C421T	Thesis	BITS	C442T	Seminar
	BITS	C441T	Seminar	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 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 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 Optimisation 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 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.

HIGHER DEGREE PROGRAMMES

M.E./M.PHARM./M.PHIL./MBA PROGRAMMES

A. Requirements

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

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

- (a) Dissertation: 15 (Min.) – 25 (Max) Units

OR

Practice School : 20 units

- (b) Course work : 35 (Min) units

(other than Dissertation/Practice School)

Courses for the course work will be chosen from the list of named 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).

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

- (a) Dissertation : 12 (Min.) - 25 (Max.) units

OR

Practice School : 20 units

- (b) 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.

- (iii) **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
Named Courses	40-60	15-20
Elective(s)	12-18	4-6
Subtotal	55 (Min.)	20 (Min.)
PS or Dissertation	20 or 16	1
Total	70 (Min.)	21 (Min.)

Courses for the course work will be chosen from the list of named 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 DLPD 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
Biotechnology										
I	BIO	G512	Molecular Mechanism of Gene Expression	5	BIO	G513	Microbial & Fermentation Technology	5		
	BIO	G542	Advanced Cell and Molecular Biology	5	BIO	G641	Cell & Tissue Culture Technology	4		
	BIO	G611	Environmental Biotechnology	5	BIO	G643	Plant Biotechnology	5		
	BITS	G659	Technical Communication	4	BITS	G620	Professional Practice I	3		
				19					17	
II	BIO	G642	Experimental Techniques	5	BITS	G629T	Dissertation	16		
	BITS	G621	Professional Practice II	3	BITS	G639	OR	Practice School		
			Elective	*						
			Elective	*						
				14					16/20	
Chemical										
I	BITS	G659	Technical Communication	4	BITS	G620	Professional Practice I	3		
	CHE	G541	Process Plant Simulation	4	CHE	G542	Computational Transport Phenomena	5		
	CHE	C473	Advanced Process Control	4	CHE	G614	Advanced Heat Transfer	5		
	CHE	G513	Environmental Management Systems	5	CHE	G641	Reaction Engineering	5		
				17					18	
II	BITS	G621	Professional Practice II	3	BITS	G629T	Dissertation	16		
	CHE	G615	Advanced Separation Processes	5	BITS	G639	OR	Practice School		
			Elective	*						
			Elective	*						
				14					16/20	
Chemical – Petroleum Engineering										
I	BITS	G659	Technical Communication	4	BITS	G620	Professional Practice I	3		
	CHE	G541	Process Plant Simulation	4	CHE	G542	Computational Transport Phenomena	5		
	CHE	C473	Advanced Process Control	4	CHE	G617	Petroleum Refinery Engineering	5		
	CHE	G616	Petroleum Reservoir Engineering	5	CHE	G618	Petroleum Downstream Processing	5		
				17					18	
II	BITS	G621	Professional Practice II	3	BITS	G629T	Dissertation	16		
	CHE	G615	Advanced Separation Processes	5	BITS	G639	or	Practice School		
			Elective	*						
			Elective	*						
				14					16/20	
Civil – Infrastructure Systems										
I	BITS	G659	Technical Communication	4	BITS	G620	Professional Practice I	3		
	CE	G515	Fundamentals of Systems Engineering	4	CE	G516	Multicriteria Analysis in Engineering	4		
	CE	G523	Transportation Systems Planning and Management	4	CE	G517	Waste Management Systems	4		
	CE	G525	Water Resources Planning and Management	4	CE	G520	Infrastructure Planning and Management	4		
				16					15	
II	BITS	G621	Professional Practice II	3	BITS	G629T	Dissertation	16		
	IS	C472	Geographical Information System	3	BITS	G639	OR	Practice School		
			Elective	*						
			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
Civil – Structural Engineering										
I	BITS	G659	Technical Communication	4	BITS	G620	Professional Practice I	3		
	CE	G615	Earthquake Engineering	4	CE	G610	Computer Aided Analysis and Design in Civil Engineering	5		
	CE	G617	Advance Structural Analysis	4						
	CE	G619	Finite Element Analysis	5	CE	G513	Advance Computational Techniques Elective	4	*	
				17					15	
II	BITS	G621	Professional Practice II	3	BITS	G629T	Dissertation OR	16		
			Elective	*	BITS	G639	Practice School	20		
			Elective	*						
			Elective	*						
				12					16/20	
Civil – Transportation Engineering										
I	BITS	G659	Technical Communication	4	BITS	G620	Professional Practice I	3		
	CE	G523	Transportation Systems Planning and Management	4	CE	G518	Pavement Analysis and Design	4		
	CE	G534	Pavement Material Characterization	4	CE	G536	Traffic Engineering and Safety	4		
	CE	G535	Highway Geometric Design	4	CE	G537	Transport Economics and Finance	4		
	IS	C472	Geographical Information System	3	CE	G532	Advanced Soil Mechanics	4		
					19					19
II	BITS	C621	Professional Practice II	4	BITS	G629T	Dissertation OR	16		
	CE	G524	Urban Mass Transit Planning, Operations and Management	4						
	CE	G532	Project Planning and Management	4	BITS	G639	Practice School	20		
			Elective	*						
		Elective	*							
				18					16/20	
Communication Engineering										
I	BITS	G659	Technical Communication	4	BITS	G620	Professional Practice I	3		
	EEE	C415	Digital Signal Processing	3	EEE	G591	Optical Communication	5		
	EEE	G581	RF and Microwave Engg.	5	EEE	G592	Mobile and Personal Communication	5		
	EEE	G612	Coding Theory and Practice	5	EEE	G622	Advanced Digital Communication	5		
					17					18
II	BITS	G621	Professional Practice II	3	BITS	G629T	Dissertation OR	16		
	EEE	C472	Satellite Communication	3	BITS	G639	Practice School	20		
			Elective	*						
			Elective	*						
				12					16/20	
Computer Science										
I	BITS	G659	Technical Communication	4	BITS	G620	Professional Practice I	3		
	CS	G551	Advanced Compilation Techniques	5	CS	G513	Network Security	4		
	CS	G562	Advanced Architecture and Performance Evaluation	5	CS	G514	Object Oriented Analysis and Design	4		
	CS	G623	Advanced Operating System	5	CS	G553	Reconfigurable Computing	5		
					19					16
II	BITS	G621	Professional Practice II	3	BITS	G629T	Dissertation OR	16		
	EEE	G512	Embedded System Design	4	BITS	G639	Practice School	20		
			Elective	*						
			Elective	*						
				13					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
Electrical – Power Electronics and Drives										
I	BITS	G659	Technical Communication	4	EEE	G544	Steady state and dynamics of electric motors	5		
	EEE	G541	Distribution apparatus and configurations	5	EEE	G545		Control and instrumentation for systems	5	
	EEE	G542	Power electronic converters	5	EEE	G552	Solid state drives	5		
	EEE	G543	Power device microelectronics and selections	3	BITS	G620	Professional Practice I	3		
					17					18
II	EEE	G546	Systems simulation lab	4	BITS	G629T	Dissertation	16		
	BITS	G621	Professional Practice II	3			OR			
			Elective	*	BITS	G639	Practice School	20		
			Elective	*					16/20	
				13					16/20	
Embedded Systems										
I	BITS	G659	Technical Communication	4	BITS	G620	Professional Practice I	3		
	BITS	G553	Real Time Systems	5	CS	C424	Software for Embedded Systems	3		
	CS	G555	System Specification & Modelling	4	EEE	G512	Embedded System Design	4		
	EEE	C415	Digital Signal Processing	3	MEL	G642	VLSI Architectures	4		
					16					14
II	BITS	G621	Professional Practice II	3	BITS	G629T	Dissertation	16		
	EEE	G626	Hardware Software Co-design	4			OR			
			Elective	*	BITS	G639	Practice School	20		
			Elective	*					16/20	
				13					16/20	
Microelectronics										
I	BITS	G659	Technical Communication	4	BITS	G620	Professional Practice I	3		
	MEL	G611	IC Fabrication Technology	5	MEL	G632	Analog IC Design	5		
	MEL	G621	VLSI Design	5	MEL	G641	CAD for IC Design	5		
	MEL	G631	Physics and Modelling of Microelectronic Devices	5	MEL	G642	VLSI Architectures	4		
					19					17
II	BITS	G621	Professional Practice II	3	BITS	G629T	Dissertation	16		
			Elective	*			OR			
			Elective	*	BITS	G629T	Practice School	20		
			Elective	*					16/20	
				12					16/20	
Manufacturing Systems Engineering										
I	BITS	G659	Technical Communication	4	BITS	G620	Professional Practice I	3		
	EA	C412	Flexible Manufacturing Systems	4	MSE	G511	Mechatronics	5		
	ME	C443	Quality Control, Assurance & Reliability	3	MSE	G512	Manufacturing Planning and Control	4		
	ME	G511	Mechanisms and Robotics	5	MSE	G531	Concurrent Engineering	5		
					16					16
II	BITS	G621	Professional Practice II	3	BITS	G629T	Dissertation	16		
	MSE	G521	World-class Manufacturing	5			OR			
			Elective	*	BITS	G639	Practice School	20		
			Elective	*					16/20	
				14					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
Mechanical Engineering									
I	BITS	G659	Technical Communication	4	BITS	G620	Professional Practice I	3	
	ME	C443	Quality Control, Assurance & Reliability	3	ME	G532	Machine Tool Engineering	5	
	ME	G511	Mechanisms and Robotics	5	ME	G611	Computer Aided Analysis and Design	5	
	ME	G512	Finite Element Methods	5	ME	G631	Heat Transfer	5	
					17				18
II	BITS	G621	Professional Practice II	3	BITS	G629T	Dissertation	16	
	ME	G641	Theory of Elasticity & Plasticity	5	OR				
			Elective	*	BITS	G639	Practice School	20	
			Elective	*					
				14				16/20	
Design Engineering									
I	BITS	G659	Technical Communication	4	BITS	G620	Professional Practice I	3	
	DE	G611	Dynamics & Vibration	5	DE	G631	Materials Technology & Testing	5	
	ME	G511	Mechanisms and Robotics	5	ME	G521	Mechanical System Design	5	
	ME	G512	Finite Element Methods	5	ME	G611	Computer Aided Analysis and Design	5	
					19				18
II	BITS	G621	Professional Practice II	3	BITS	G629T	Dissertation	16	
	DE	G531	Product Design	5	OR				
			Elective	*	BITS	G639	Practice School	20	
			Elective	*					
				14				16/20	
Pharmacy									
I	BITS	G659	Technical Communication	4	BITS	G620	Professional Practice I	3	
	PHA	G532	Quality Assurance & Regulatory Affairs	5	PHA	G611	Advanced Pharmacology	5	
	PHA	G612	Pharmacokinetics & Clinical Pharmacy	5	PHA	G621	Advanced Medicinal Chemistry	5	
	PHA	G614	Clinical Pharmacy & Therapeutics	5	PHA	G632	Dosage Form Design	5	
					19				18
II	BITS	G621	Professional Practice II	3	BITS	G629T	Dissertation	16	
	PHA	G613	Pharmaceutical Biotechnology	5	OR				
			Elective	*	BITS	G639	Practice School	20	
			Elective	*					
				14				16/20	
Pharmacy – Pharmaceutics									
I	BITS	G659	Technical Communication	4	BITS	G620	Professional Practice I	3	
	PHA	G532	Quality Assurance & Regulatory Affairs	5	PHA	G611	Advanced Pharmacology	5	
	PHA	G612	Pharmacokinetics & Clinical Pharmacy	5	PHA	G621	Advanced Medicinal Chemistry	5	
	PHA	G614	Clinical Pharmacy & Therapeutics	5	PHA	G632	Dosage Form Design	5	
					19				18
II	BITS	G621	Professional Practice II	3	BITS G629T Dissertation			16	
	PHA	G542	Advanced Physical Pharmaceutics	5	or			20	
			Elective	*	BITS G639 Practice School				
			Elective	*					
				14				16/20	
Pharmacy – Pharmaceutical Chemistry									
I	BITS	G659	Technical Communication	4	BITS	G620	Professional Practice I	3	
	PHA	G532	Quality Assurance & Regulatory Affairs	5	PHA	G611	Advanced Pharmacology	5	
	PHA	G612	Pharmacokinetics & Clinical Pharmacy	5	PHA	G621	Advanced Medicinal Chemistry	5	
	PHA	G614	Clinical Pharmacy & Therapeutics	5	PHA	G632	Dosage Form Design	5	
					19				18
II	BITS	G621	Professional Practice II	3	BITS G629T Dissertation			16	
	PHA	G522	Chemistry of Macromolecules	4	or			20	
			Elective	*	BITS G639 Practice School				
			Elective	*					
				13				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
Software System										
I	BITS	C481	Computer Networks	3	BITS	G620	Professional Practice I	3		
	BITS	G659	Technical Communication	4	SS	G515	Data Warehousing	5		
	SS	G514	Object Oriented Programming & Design	4	SS	G516	Computer Organization and Software Systems	5		
	SS	G562	Software Engineering & Management	5			Elective	*		
				16						16
II	BITS	G621	Professional Practice II	3	BITS	G629T	Dissertation	16		
	SS	G531	Pervasive Computing	4			OR			
	SS	G653	Software Architecture	5	BITS	G639	Practice School	20		
			Elective	*						
				15						16/20
Master of Business Administration										
I	MBA	C311	Business Structure & Processes	4	MBA	C416	Corporate Finance & Taxation	4		
	MBA	C317	Managerial Skills	1	MBA	C319	Negotiation Skills & Techniques	2		
	MBA	C312	Managerial Economics	3	MBA	C418	Marketing	4		
	MBA	C411	Organizational Behaviour	4	MBA	C412	Human Resource Management	4		
	MBA	C417	Managerial Communication	4	MBA	C419	Production & Operations Management	4		
	MBA	C313	Business Law	3	MBA	C471	Management Information Systems	3		
	MBA	C413	Quantitative Methods	4	MBA	C421	Supply Chain Management	4		
	MBA	C415	Financial & Management Accounting	4						
				27						25
II	MBA	C422	Business and Society	4	BITS	G561	Dissertation	16		
	MBA	C423	Business Policy & Strategic Management	4			OR			
	MBA	C424	International Business	3	BITS	G560	Practice School	20		
		Elective(s)	12							
				23						16/20
Master in Public Health										
I	MPH	G510	Biostatistics & Computers in Public Health	5	MPH	G521	Health Care Management	4		
	MPH	G512	Environmental and Occupational Health	4	MPH	G522	Preventive Nutrition & Health Promotion	4		
	MPH	G513	Public Health & Diseases	4	MPH	G523	Epidemic & Disaster Management	4		
	MPH	G613	Health System and Society	2	MPH	G692	Epidemiology	2		
	MPH	G515	Communication in Health Care	4	BITS	G620	Professional Practice I	3		
					19					
II	BITS	G621	Professional Practice II	3	BITS	G629T	Dissertation	16		
	MPH	G531	Health Economics & Financial Management	4			OR			
			Elective	*	BITS	G639	Practice School	20		
			Elective	*						
		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 I 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.

Pattern 2 Semesterwise Pattern for Students Admitted to Higher Degree Programmes in the Second Semester										
Year	First Semester				U	Second Semester				U
Biotechnology										
I						BIO	G513	Microbial & Fermentation Technology		5
						BIO	G641	Cell & Tissue Culture Technology		4
						BIO	G643	Plant Biotechnology		5
						BITS	G659	Technical Communication		4
18										
II	BIO	G512	Molecular Mechanism of Gene Expression		5	BIO	G542	Advanced Cell and Molecular Biology		5
	BIO	G611	Environmental Biotechnology		5	BITS	G621	Professional Practice II		3
	BIO	G642	Experimental Techniques		5			Elective		*
	BITS	G620	Professional Practice I		3			Elective		*
					18					14
III	BITS	G629T	Dissertation		16					
						OR				
	BITS	G639	Practice School		20					
16/20										
Chemical										
I						BITS	G659	Technical Communication		4
						CHE	G542	Computational Transport Phenomena		5
						CHE	C473	Advanced Process Control		4
						CHE	G614	Advanced Heat Transfer		5
18										
II	BITS	G620	Professional Practice I		3	BITS	G621	Professional Practice II		3
	CHE	G541	Process Plant Simulation		4	CHE	G641	Reaction Engineering		4
	CHE	G615	Advanced Separation Processes		5			Elective		*
	CHE	G513	Environmental Management Systems		5			Elective		*
					17					13
III	BITS	G629T	Dissertation		16					
						OR				
	BITS	G639	Practice School		20					
16/20										
Chemical – Petroleum Engineering										
I						BITS	G659	Technical Communication		4
						CHE	G542	Computational Transport Phenomena		5
						CHE	G617	Petroleum Refinery Engineering		5
						CHE	C473	Advanced Process Control		4
18										
II	BITS	G620	Professional Practice I		3	BITS	G621	Professional Practice II		3
	CHE	G541	Process Plant Simulation		4	CHE	G618	Petroleum Downstream Processing		5
	CHE	G615	Advanced Separation Processes		5			Elective		*
	CHE	G616	Petroleum Reservoir Engineering		5			Elective		*
					17					14
III	BITS	G629T	Dissertation		16					
						or				
	BITS	G639	Practice School		20					
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 2 Semesterwise Pattern for Students Admitted to Higher Degree Programmes in the Second Semester										
Year	First Semester				U	Second Semester				U
Civil – Structural Engineering										
I						BITS	G659	Technical Communication		4
						CE	G513	Advance Computational Techniques		4
						CE	G610	Computer Aided analysis and Design in Civil Engineering		5
								Elective		*
16										
II	BITS	G620	Professional Practice I		3	BITS	G621	Professional Practice II		3
	CE	G615	Earthquake Engineering		4			Elective		*
	CE	G617	Advance Structural Analysis		4			Elective		*
	CE	G619	Finite Element Analysis		5			Elective		*
16										
12										
III	BITS	G629T	Dissertation		16					
			OR							
	BITS	G639	Practice School		20					
16/20										
Communication Engineering										
I						BITS	G659	Technical Communication		4
						EEE	C415	Digital Signal Process		3
						EEE	G592	Mobile and Personal Communication		5
						EEE	G622	Advanced Digital Communication		5
17										
II	BITS	G620	Professional Practice I		3	BITS	G621	Professional Practice II		3
	EEE	C472	Satellite Communication		3	EEE	C591	Optical Communication		5
	EEE	G581	RF and Microwave Engg.		5			Elective		*
	EEE	G612	Coding Theory and Practice		5			Elective		*
16										
14										
III	BITS	G629T	Dissertation		16					
			OR							
	BITS	G639	Practice School		20					
16/20										
Computer Science										
I						BITS	G659	Technical Communication		4
						CS	G513	Network Security		4
						CS	G514	Object Oriented Analysis and Design		4
						CS	G553	Reconfigurable Computing		5
17										
II	BITS	G620	Professional Practice I		3	BITS	G621	Professional Practice II		3
	CS	G551	Advanced Compilation Techniques		5	EEE	G512	Embedded System Design		4
	CS	G562	Advanced Architecture and Performance Evaluation		5			Elective		*
	CS	G623	Advanced Operating System		5			Elective		*
18										
13										
III	BITS	G629T	Dissertation		16					
			OR							
	BITS	G639	Practice School		20					
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 2 Semesterwise Pattern for Students Admitted to Higher Degree Programmes in the Second Semester								
Year	First Semester			U	Second Semester			U
Embedded Systems								
I					BITS G659	Technical Communication	4	
					CS C424	Software for Embedded System	3	
					EEE C415	Digital Signal Process	3	
					EEE G512	Embedded System Design	4	
							14	
II	BITS G620	Professional Practice I	3	BITS G624	Professional Practice II	3		
	BITS G553	Real Time System	5	MEL G642	VLSI Architecture	4		
	CS C555	System Specific & Model	4		Elective	*		
	EEE G626	Hardware Software Co-design	4		Elective	*		
				16			13	
III	BITS G629T	Dissertation	16					
	OR							
	BITS G639	Practice School	20					
			16/20					
Manufacturing Systems Engineering								
I					BITS G659	Technical Communication	4	
					MSE G511	Mechatronics	5	
					MSE G512	Manufacturing Planning and Control	4	
					MSE G531	Concurrent Engineering	5	
							18	
II	BITS G620	Professional Practice I	3	BITS G621	Professional Practice II	3		
	EA C412	Flexible Manufacturing Systems	4	MSE G521	World-class Manufacturing	5		
	ME C443	Quality Control, Assurance & Reliability	3		Elective	*		
	ME G511	Mechanisms and Robotics	5		Elective	*		
				15			14	
III	BITS G629T	Dissertation	16					
	OR							
	BITS G639	Practice School	20					
			16/20					
Mechanical Engineering								
I					BITS G659	Technical Communication	4	
					ME G532	Machine Tool Engineering	5	
					ME G611	Computer Aided Analysis and Design	5	
					ME G631	Heat Transfer	5	
							19	
II	BITS G620	Professional Practice I	3	BITS G621	Professional Practice II	3		
	ME C443	Quality Control, Assurance & Reliability	3	ME G641	Theory of Elasticity & Plasticity	5		
	ME G511	Mechanisms and Robotics	5		Elective	*		
	ME G512	Finite Element Methods	5		Elective	*		
				16			14	
III	BITS G629T	Dissertation	16					
	OR							
	BITS G639	Practice School	20					
			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 2 Semesterwise Pattern for Students Admitted to Higher Degree Programmes in the Second Semester							
Year	First Semester			U	Second Semester		U
Design Engineering							
I					BITS G659	Technical Communication	4
					DE G631	Materials Technology & Testing	5
					ME G521	Mechanical System Design	5
					ME G611	Computer Aided Analysis and Design	5
							19
II	BITS G620	Professional Practice I	3	BITS G621	Professional Practice II	3	
	DE G611	Dynamics & Vibration	5	DE G531	Product Design	5	
	ME G511	Mechanisms and Robotics	5		Elective	*	
	ME G512	Finite Element Methods	5		Elective	*	
							18
III	BITS G629T	Dissertation	16				
		OR					
	BITS G639	Practice School	20				
						16/20	
Pharmacy							
I					BITS G659	Technical Communication	4
					PHA G614	Clinical Pharmacy & Therapeutics	5
					PHA G621	Advanced Medicinal Chemistry	5
					PHA G632	Dosage Form Design	5
							19
II	BITS G620	Professional Practice I	3	BITS G621	Professional Practice II	3	
	PHA G532	Quality Assurance & Regulatory Affairs	5	PHA G611	Advanced Pharmacology	5	
	PHA G612	Pharmacokinetics & Clinical Pharmacy	5		Elective	*	
	PHA G613	Pharmaceutical Biotechnology	5		Elective	*	
							18
III	BITS G629T	Dissertation	16				
		OR					
	BITS G639	Practice School	20				
						16/20	
Pharmacy – Pharmaceutics							
I					BITS G659	Technical Communication	4
					PHA G614	Clinical Pharmacy & Therapeutics	5
					PHA G621	Advanced Medicinal Chemistry	5
					PHA G632	Dosage Form Design	5
							19
II	BITS G620	Professional Practice I	3	BITS G621	Professional Practice II	3	
	PHA G532	Quality Assurance & Regulatory Affairs	5	PHA G611	Advanced Pharmacology	5	
	PHA G612	Pharmacokinetics & Clinical Pharmacy	5		Elective	*	
	PHA G542	Advanced Physical Pharmaceutics	5		Elective	*	
							18
III	BITS G629T	Dissertation	16				
		or					
	BITS G639	Practice School	20				
						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 2 Semesterwise Pattern for Students Admitted to Higher Degree Programmes in the Second Semester								
Year	First Semester			U	Second Semester			U
Pharmacy – Pharmaceutical Chemistry								
I					BITS	G659	Technical Communication	4
					PHA	G614	Clinical Pharmacy & Therapeutics	5
					PHA	G621	Advanced Medicinal Chemistry	5
					PHA	G632	Dosage Form Design	5
							19	
II	BITS	G620	Professional Practice I	3	BITS	G621	Professional Practice II	3
	PHA	G532	Quality Assurance & Regulatory Affairs	5	PHA	G611	Advanced Pharmacology	5
	PHA	G612	Pharmacokinetics & Clinical Pharmacy	5			Elective	*
	PHA	G522	Chemistry of Macromolecules	4			Elective	*
							17	
							14	
III	BITS	G629T	Dissertation or	16				
			or					
	BITS	G639	Practice School	20				
				16/20				
Software System								
I					BITS	C481	Computer Networks	3
					BITS	G659	Technical Communication	4
					SS	G514	Object Oriented Analysis & Design	4
					SS	G515	Data Warehousing	5
							16	
II	BITS	G620	Professional Practice I	3	BITS	G621	Professional Practice II	3
	SS	G531	Pervasive Computing	4	SS	G516	Comp. Organization & Software Systems	5
	SS	G653	Software Architecture	5			Elective	*
	SS	G562	Software Engineering & Management	5			Elective	*
							14	
III	BITS	G629T	Dissertation	16				
			OR					
	BITS	G639	Practice School	20				
				16/20				
Master of Business Administration								
I					MBA	C311	Business Structure & Processes	4
					MBA	C312	Managerial Economics	3
					MBA	C411	Organisational Behaviour	4
					MBA	C418	Marketing	4
					MBA	C319	Negotiation Skills & Techniques	2
					MBA	C412	Human Resource Management	4
						Elective(s)	3	
							24	
II	MBA	C317	Managerial Skills	1	MBA	C423	Business Policy & Strategic Management	4
	MBA	C417	Managerial Communication	4	MBA	C416	Corporate Finance & Taxation	4
	MBA	C415	Financial & Management Accounting	4	MBA	C419	Production & Operations Management	4
	MBA	C413	Quantitative Methods	4	MBA	C471	Management Information Systems	3
	MBA	C313	Business Law	3	MBA	C421	Supply Chain Management	4
	MBA	C422	Business and Society	4	MBA	C424	International Business	3
			Elective(s)	6			Elective(s)	3
							26	
							25	
III	BITS	G561	Dissertation	16				
			OR					
	BITS	G560	Practice School	20				
				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 2 Semesterwise Pattern for Students Admitted to Higher Degree Programmes in the Second Semester								
Year	First Semester			U	Second Semester			U
Master in Public Health								
I					MPH	G521	Health Care Management	4
					MPH	G522	Preventive Nutrition & Health Promotion	4
					MPH	G523	Epidemic & Disaster Management	4
					MPH	G692	Epidemiology	2
					MPH	G515	Communication in Health Care	4
II	MPH	G510	Biostatistics & Computers in Public Health	5	BITS	G621	Professional Practice II	3
	MPH	G512	Environmental and Occupational Health		4	MPH	G531	Health Economics & Financial Management
	MPH	G513	Public Health & Diseases	4			Elective	*
	MPH	G613	Health System and Society	2			Elective	*
	MPH	G515	Communication in Health Care	4			Elective	*
	MPH	G620	Professional Practice I	3				16
III	BITS	G629T	Dissertation OR	16				
	BITS	G639	Practice School	20				
				16/20				
M.Phil Chemistry								
I					BITS	G659	Technical Communication	4
					CHEM	G552	Advanced Inorganic Chemistry	5
					CHEM	G554	Physical Methods in Chemistry	5
						Elective	3	
							17	
II	BITS	G620	Professional Practice I	3	BITS	G621	Professional Practice II	3
	CHEM	G551	Advanced Organic Chemistry	5			Elective	*
	CHEM	G553	Advanced Physical Chemistry	5			Elective	*
	CHEM	G555	Chemistry of Life Processes	4			Elective	*
							17	
III	BITS	G629T	Dissertation or	16				
	BITS	G639	Practice School	20				
				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.

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

Biotechnology

Named Courses

BIO G512	Molecular Mechanism of Gene Expression	5
BIO G513	Microbial & Fermentation Technology	5
BIO G542	Advanced Cell and Molecular Biology	5
BIO G611	Environmental Biotechnology	5
BIO G641	Cell & Tissue Culture Technology	4
BIO G642	Experimental Techniques	5
BIO G643	Plant Biotechnology	5

Electives (any two)

BENG G521	Bioinformatics	5
BIO C414	Genetic Engineering	1 6 3
BIO C417	Biomolecular Modeling	3 0 3
BIO C421	Enzymology	3 0 3
BIO C441	Biochemical Engineering	3 0 3
BIO C451	Bioprocess Technology	3
BIO C461	Recombinant DNA Technology	3 0 3
BIO G514	Molecular Immunology	5
BIO G515	Stem Cell and Regenerative Biology	3 1 4
BIO G522	Interferon Technology	4
BIO G532	Biostatistics and Biomodelling	4
BIO G612	Human Genetics	5
BIO G631	Membrane and Liposome Technology	4
BIO G632	Transgenic Technology	5
BIO G651	Protein and Enzyme Bioengineering	5
BIO G661	Gene Toxicology	4
BIO G671	Bioconversion Technology	5

Chemical

Named Courses

CHE G513	Environmental Management Systems	5
CHE G541	Process Plant Simulation	4
CHE G542	Computational Transport Phenomena	5

CHE G551	Advanced Separation Technology	5
CHE G614	Advanced Heat Transfer	5
CHE G615	Advanced Separation Processes	3 2 5
CHE G641	Reaction Engineering	5

Electives (any two)

CHE C412	Process Equipment Design	3 0 3
CHE C413	Process Plant Safety	3 0 3
CHE C421	Biochemical Engineering	3 0 3
CHE C422	Combustion Engineering	3 0 3
CHE C441	Process Control	3 0 3
CHE C471	Refrigeration and Air Conditioning	3 0 3
CHE G511	Fluidization Engineering	4
CHE G512	Petroleum Refining & Petrochemicals	4
CHE G514	Evolutionary Computation	5
CHE G521	Chemical Engineering Analysis	4
CHE G522	Polymer Technology	4
CHE G531	Project Engineering	4
CHE G532	Alternate Energy Resources	4
CHE G611	Computer Aided Analysis and Design	5
CHE G621	Fluid Dynamics	5
CHE G622	Advanced Chemical Engineering Thermodynamics	5

Chemical with Specialization in Petroleum Engineering

Named Courses

CHE C473	Advanced Process Control	3 1 4
CHE G541	Process Plant Simulation	2 2 4
CHE G542	Computational Transport Phenomena	3 2 5
CHE G615	Advanced Separation Processes	3 2 5
CHE G616	Petroleum Reservoir Engineering	3 2 5
CHE G617	Petroleum Refinery Engineering	3 2 5
CHE G618	Petroleum Downstream Processing	3 2 5

Electives (any two)

CHE C411	Environmental Pollution Control	3 0 3
----------	---------------------------------	-------

CHE C412	Process Equipment Design	3 0 3	CE G522	Pavement Design, Maintenance and Management	5
CHE C413	Process Plant Safety	3 0 3			
CHE C421	Biochemical Engineering	3 0 3	CE G524	Urban Mass Transit Planning , Operations and Management	4
CHE C422	Combustion Engineering	3 0 3			
CHE C433	Corrosion Engineering	3 0 3	CE G526	Systems Approach to Water Resources Modelling	4
CHE C471	Refrigeration and Air Conditioning	3 0 3	CE G527	Construction Management	4
CHE G511	Fluidization Engineering	2 2 4	CE G528	Selection of Construction Equipment and Modelling	4
CHE G513	Environmental Management Systems	5	CE G529	Construction Project Control Systems	4
CHE G514	Evolutionary Computation	5	CE G530	Design of Construction Operation	4
CHE G521	Chemical Engineering Analysis	2 2 4	CE G531	Environmental Conservation	4
CHE G522	Polymer Technology	2 2 4	CE G533	Advance Composite Materials for Structures	4
CHE G531	Project Engineering	2 2 4	CE G542	Water Resources and Management	4
CHE G532	Alternate Energy Resources	2 2 4	CE G610	Computer Aided Analysis & Design in Civil Engineering	5
CHE G611	Computer Aided Analysis and Design	2 3 5	CE G616	Bridge Engineering	4
CHE G621	Fluid Dynamics	2 3 5	CE G618	Design of Multi-Storey Structures	4
CHE G622	Advanced Chemical Engineering Thermodynamics	3 2 5	CE G619	Finite Element Analysis	5
CHE G641	Reaction Engineering	3 2 5	CE G518	Environmental Management Systems	3
CHE G619	Process Intensification	3 2 5	EA C442	Remote Sensing and Image Processing	3
CHE G620	Energy Integration Analysis	3 2 5			
Civil with Specialization in Infrastructure Systems					
Named Courses					
CE G515	Fundamentals of Systems Engineering	4	Civil with Specialization in Structural Engineering		
CE G516	Multicriteria Analysis in Engineering	4	Named Courses		
CE G517	Waste Management System	4	CE G513	Advance Computational Techniques	4
CE G520	Infrastructure Planning and Management	4	CE G610	Computer Aided Analysis and Design in Civil Engineering	5
CE G523	Transportation Systems Planning and Management	4	CE G615	Earthquake Engineering	4
CE G525	Water Resources Planning and Management	4	CE G617	Advanced Structural Analysis	4
IS C472	Geographical Information System	3 0 3	CE G619	Finite Element Analysis	5
Electives (any two)					
CE G511	Matrix Method in Civil Engineering	5	Electives (any four)		
BITS C474	Rural Infrastructure Planning	3 0 3	CE G514	Structural Optimization	4
CE G512	Topics in Environmental Engineering	4	CE G521	Topics in Structural Engineering	5
CE G513	Advanced Computational Techniques	4	CE G532	Advanced Soil Mechanics	4

CE G533	Advance Composite Materials for Structures	4
CE G611	Computer Aided Analysis and Design	5
CE G612	Advanced Steel Structures	4
CE G613	Advanced Concrete structures	4
CE G614	Prestressed Concrete Structures	4
CE G616	Bridge Engineering	4
CE G618	Design of multi-story structures	4
CE G620	Advanced Foundation Engineering	4
CE G621	Fluid Dynamics	5
CE G622	Soil-Structure-Interaction	4
CE G623	Ground Improvement techniques	4
CE G631	Selected Topics in Soil Mechanics and Geotechnical Engineering	4
CE G641	Theory of Elasticity & Plasticity	5

Civil with Specialization in Transportation Engineering

Named Courses

CE G518	Pavement Analysis and Design	4
CE G523	Transportation Systems Planning and Management	4
CE G524	Urban Mass Transit Planning, Operations & Management	4
CE G532	Advanced Soil Mechanics	4
CE G534	Pavement Material Characterization	4
CE G535	Highway Geometric Design	4
CE G536	Traffic Engineering and Safety	4
CE G537	Transport Economics and Finance	4
CE G538	Project Planning and Management	4
IS C472	Geographical Information System	3 0 3

Electives (any two)

Pool 1 for electives 1

CE G516	Multi Criteria Analysis in Engineering	4
CE G543	Traffic Flow Theory	4
CE G544	Environmental Impact Assessment	4
CE G545	Airport Planning and Design	4
CE G616	Bridge Engineering	4
CE G619	Finite Element Analysis	5

Pool 2 for electives 2

CE G520	Infrastructure Planning and Management	4
CE G528	Selection of Construction Equipment and Modeling	4
CE G546	Highway Construction Practices	4
CE G547	Pavement Failures, Evaluation and Rehabilitation	4
CE G548	Pavement Management Systems	4
CE G549	Rural Road Technology	4

Communication Engineering

Named Courses

EEE C415	Digital Signal Processing	3 0 3
EEE C472	Satellite Communication	3 0 3
EEE G581	RF and Microwave Engg.	5
EEE G591	Optical Communication	5
EEE G592	Mobile and Personal Communication	5
EEE G612	Coding Theory and Practice	5
EEE G622	Advanced Digital Communication	5

Electives (any two)

BITS G553	Real Time Systems	5
BITS G554	Data Compression	3 2 5
CS G553	Reconfigurable Computing	5
CS G555	System Specifications and Modeling	4
EA C415	Introduction to MEMS	4
EA C451	Internetworking Technology	3 0 3
EA C473	Multimedia Computing	3 0 3
EEE C414	Telecom Switching Systems & Networks	3 0 3
EEE G510	RF Microelectronics	5
EEE G512	Embedded System Design	4
EEE G521	Optoelectronic Devices, Circuits and Systems	5
EEE G531	Testable Design and Fault Tolerant Computing	5
EEE G582	Telecom network Management	5
EEE G611	Computer Aided Analysis and Design	5
EEE G613	Advanced Digital Signal Processing	5

EEE G626	Hardware Software Codesign	4	CS G611	Distributed Processing Systems	4
MEL G621	VLSI Design	5	CS G612	Fault Tolerant System Design	5
MEL G632	Analog IC Design	5	CS G631	Devices, Data Communication and Control	5
Computer Science			CS G632	Application Driven System Design	4
Named Courses			CS G641	Microprocessor Based Systems Design	5
CS G513	Network Security	4	CS G642	Recent Advances in Computing	4
CS G514	Object Oriented Analysis and Design	4	CS G651	Symbolic Computing & Computer Algebra	4
CS G551	Advanced Compilation Techniques	5	CS G652	Digital Communications and Message Switching	5
CS G553	Reconfigurable Computing	5	CS G653	Software Architecture	5
CS G562	Advanced Architecture and Performance Evaluation	5	CS G671	Advanced Computer Graphics	5
CS G623	Advanced Operating System	5	EA C451	Internetworking Technologies	3 0 3
EEE G512	Embedded System Design	4	EA C473	Multimedia Computing	3 0 3
Elective Courses (any two)			EEE G582	Telecom Network Management	5
BITS C463	Cryptography	3 0 3	EEE G612	Coding Theory & Practice	5
BITS C464	Machine Learning	3 0 3	EEE G626	Hardware Software Codesign	4
BITS G553	Real Time Systems	5	EEE G627	Networked Embedded Applications	4
BITS G554	Data Compression	3 2 5	IS C462	Network Programming	3 0 3
BITS G624	Computer Based Simulation & Modelling	5	MATH G541	Advanced Methods in Discrete Mathematics	5
CS C415	Data Mining	3 0 3	MATH C412	Concepts of Geometry	3 0 3
CS C422	Parallel Computing	3 0 3	MATH C431	Distribution Theory	3 0 3
CS C424	Software for Embedded Systems	3 0 3	MATH G531	Number Theory	5
CS C441	Selected Topics from Computer Science	3	SS G515	Data Warehousing	5
CS C442	Advanced Algorithms & Complexity	3 0 3	Design Engineering		
CS C446	Data Storages Technologies and Networks	3 0 3	Named Courses		
CS C451	Combinatorial Mathematics	3 0 3	DE G611	Dynamics & Vibration	5
CS C453	Discrete Mathematical Structures	3 0 3	DE G531	Product Design	5
CS C461	Computer Networks	3 0 3	DE G631	Materials Technology & Testing	5
CS C471	Computer Graphics	3 0 3	ME G511	Mechanisms and Robotics	5
CS G512	Introduction of Authoring Systems	4	ME G512	Finite Element Methods	4
CS G515	Queueing System Theory	5	ME G521	Mechanical System Design	5
CS G531	Testable Design & Fault Tolerant Computing	5	ME G611	Computer Aided Analysis and Design	5
CS G541	Pervasive Computing	4			
CS G554	Distributed Data Systems	3 2 5			

Electives (any two)

DE G513	Tribology	5
DE G514	Fracture Mechanics	5
DE G521	Instrumentation and Applied Electronics	5
DE G522	Design Projects	5
EA C415	Introduction to MEMS	4
MSE G511	Mechatronics	5
MSE G531	Concurrent Engineering	5
MST G511	Nondestructive Testing Techniques	3 2 5
MST G522	Advanced Composites	5
MST G531	Experimental Stress Analysis Techniques	5

Electrical with specialization in Power Electronics & Drives**Named Courses**

EEE G541	Distribution apparatus and configurations	5
EEE G542	Power Electronic Converters	5
EEE G543	Power Device Microelectronics and Selections	3
EEE G544	Steady State and Dynamics of Electric Motors	5
EEE G545	Control and Instrumentation for PE Systems	3
EEE G546	Systems Simulation Lab	4
EEE G552	Solid State Drives	5

Electives (any two)

EEE G553	Utility Applications of Power Electronics.	3
EEE G554	Soft Switching Converter Technologies	3
EEE G555	Transformer and Motor Design	3
EEE G556	DSP Based Implementation of Drives	3
EEE G557	Drives for Electric Traction	3

Embedded Systems**Named Courses**

BITS G553	Real Time Systems	5
CS C424	Software For Embedded Systems	3 0 3
CS G555	System Specification & Modelling	3 3 4

EEE C415	Digital Signal Processing	3 0 3
EEE G512	Embedded System Design	3 1 4
EEE G626	Hardware Software Co-design	4
MEL G642	VLSI Architectures	2 2 4

Electives (any two)

BITS G554	Data compression	3 2 5
CS G541	Pervasive Computing	4
CS G553	Reconfigurable Computing	5
CS G562	Advanced Architecture and Performance Evaluation	3 2 5
CSG612	Fault tolerant System Design	2 3 5
EEE G592	Mobile and Personal Communication	3 2 5
EEE G613	Advanced Digital Signal Processing	5
EEEG621	Advanced Electronic Circuits	3 2 5
EEE G625	Safety Critical Embedded System Design	4
EEE G627	Networked Embedded Applications	4
INSTR G611	Advanced Control Systems	3 2 5
MEL G626	VLSI Test and Testability	5

Manufacturing Systems Engineering**Named Courses**

EA C412	Flexible Manufacturing Systems	3 2 4
ME C443	Quality Control, Assurance & Reliability	3 0 3
ME G511	Mechanisms and Robotics	5
MSE G511	Mechatronics	5
MSE G512	Manufacturing Planning and Control	4
MSE G521	World-class Manufacturing	5
MSE G531	Concurrent Engineering	5

Electives (any two)

BITS C471	Management Information Systems	3 0 3
DE G522	Design Projects	5
DE G531	Product Design	5
DE G631	Materials Technology & Testing	5
EA C415	Introduction to MEMS	4
ITEB G621	Supply Chain Management	4
ME C412	Production Planning & Control	3 0 3

ME C432	Computer Aided Manufacturing	3 0 3	Microelectronics		
			Named Courses		
ME C472	Precision Engineering	3 0 3	MEL G611	IC Fabrication Technology	5
ME G532	Machine Tool Engineering	5	MEL G621	VLSI Design	5
ME G611	Computer Aided Analysis and Design	5	MEL G631	Physics and Modelling of Microelectronic Devices	5
MGTS C481	Industrial Marketing	3 0 3	MEL G632	Analog IC Design	5
MM G522	Total Quality Management	4	MEL G641	CAD for IC Design	5
MSE G513	Maintenance Engineering	4	MEL G642	VLSI Architectures	4
MSE G514	Leadership and Managing Change	4	Electives (any three)		
Mechanical Engineering			BITS G554	Data Compression	3 2 5
Named Courses			CS G553	Reconfigurable Computing	5
ME C443	Quality Control, Assurance & Reliability	3 0 3	CS G555	System Specifications and Modeling	4
ME G511	Mechanisms and Robotics	5	CS G562	Advanced Architecture and Performance Evaluation	3 2 5
ME G512	Finite Element Methods	5	CS G612	Fault Tolerant System Design	5
ME G532	Machine Tool Engineering	5	EA C415	Introduction to MEMS	4
ME G611	Computer Aided Analysis and Design	5	EEE C415	Digital Signal Processing	3 0 3
ME G631	Heat Transfer	5	EEE G510	RF Microelectronics	5
ME G641	Theory of Elasticity & Plasticity	5	EEE G512	Embedded System Design	4
			EEE G592	Mobile and Personal Communication	5
Electives (any two)			EEE G626	Hardware Software Codesign	4
DE G513	Tribology	5	MEL G512	Optoelectronic Devices, Circuits and Systems	5
DE G514	Fracutre mechanics	5	MEL G531	Testable Design & Fault Tolerant Computing	5
DE G522	Digital Projects	5	MEL G612	Integrated Electronic System Design	4
EA C415	Introduction to MEMS	4	MEL G622	Introduction to Artificial Neural Networks	4
ITEB G621	Supply Chain Management	4	MEL G623	Advanced VLSI Design	5
ME C472	Precision Engineering	3 0 3	MEL G624	Advanced VLSI Architectures	5
ME G513	Heating and Cooling of Buildings	5	MEL G625	Advanced Analog and Mixed Signal Design	5
ME G514	Turbomachinery	5	MEL G626	VLSI Test and Testability	5
ME G515	Computational Fluid Dynamics	5	Pharmacy		
ME G516	Energy Systems Engineering	5	Named Courses		
ME G521	Mechanical System Design	5	PHA G532	Quality Assurance & Regulatory Affairs	5
ME G621	Fluid Dynamics	5	PHA G611	Advanced Pharmacology	5
MM G522	Total Quality Management	5	PHA G612	Pharmacokinetics & Clinical Pharmacy	5
MSE G513	Maintenance Engineering	4			
MST G511	Nondestructive Techniques	3 2 5			
MST G522	Advanced Composites	5			
MST G531	Experimental Stress Analysis Techniques	5			

PHA G613	Pharmaceutical Biotechnology	5	Electives (any two)	
PHA G614	Clinical Pharmacy & Therapeutics	5	PHA G543	Clinical Research 5
PHA G621	Advanced Medicinal Chemistry	5	PHA G616	Pharmaceutical Administration and Management 5
PHA G632	Dosage Form Design	5	PHA G617	Advanced Drug Delivery Systems 3 2 5
Electives Courses (any two)			M.Pharm. with specialization in Pharmaceutical Chemistry	
BIO C414	Genetic Engineering	1 6 3	Named Courses	
BIO C417	Biomolecular Modeling	3 0 3	PHA G522	Chemistry of Macromolecules 2 2 4
PHA G511	Fermentation and Biotechnology	5	PHA G532	Quality Assurance and Regulatory Affairs 3 2 5
PHA G512	Chemistry of Natural Drugs	4	PHA G611	Advanced Pharmacology 2 3 5
PHA G521	Molecular Biology and Immunology	4	PHA G612	Pharmacokinetics & Clinical Pharmacy 2 3 5
PHA G522	Chemistry of Macromolecules	4	PHA G614	Clinical Pharmacy & Therapeutics 2 3 5
PHA G531	Disinfection and Sterilization	4	PHA G621	Advanced Medicinal Chemistry 2 3 5
PHA G541	Computer Aided Drug Design	5	PHA G632	Dosage Form Design 2 3 5
PHA G542	Advanced Physical Pharmaceutics	3 2 5	Electives (any two)	
PHA G615	Pharmacy Practice	5	PHA G512	Chemistry of Natural Drugs 2 2 4
PHA G616	Pharmaceutical Administration and Management	5	PHA G541	Computer Aided Drug Design 3 2 5
PHA G622	Chemistry of Natural Drugs and Macromolecules	5	PHA G618	Reterosynthetic Analysis 3 2 5
PHA G642	Lab. Projects	6	Software Systems	
M.Pharm. with specialization in Pharmaceutics			Named Courses	
Named Courses			BITS C481	Computer Networks 3 0 3
PHA G532	Quality Assurance and Regulatory Affairs	3 2 5	SS G514	Object Oriented Analysis and Design 4
PHA G542	Advanced Physical Pharmaceutics	3 2 5	SS G515	Data Warehousing 5
PHA G611	Advanced Pharmacology	2 3 5	SS G516	Computer Organization and Software Systems 5
PHA G612	Pharmacokinetics & Clinical Pharmacy	2 3 5	SS G531	Pervasive Computing 4
PHA G614	Clinical Pharmacy & Therapeutics	2 3 5	SS G562	Software Engineering & Management 5
PHA G621	Advanced Medicinal Chemistry	2 3 5	SS G653	Software Architecture 5
PHA G632	Dosage Form Design	2 3 5	Elective Courses (any two)	
			BITS C463	Cryptography 3 0 3
			BITS C464	Machine Learning 3 0 3
			BITS G553	Real Time Systems 5
			BITS G554	Data Compression 3 2 5
			EA C451	Internetworking Technologies 3 0 3

EA C473	Multimedia Computing	3 0 3	MBA C415	Financial and Management Accounting	4
EEE G512	Embedded System Design	4	MBA C416	Corporate Finance and Taxation	4
IS C415	Data Mining	3 0 3	MBA C417	Managerial Communication	4
IS C422	Parallel Computing	3 0 3	MBA C418	Marketing	4
IS C424	Software for Embedded System	3 0 3	MBA C419	Production and Operations Management	4
IS C446	Data Storage Technologies & Networks	3 0 3	MBA C421	Supply Chain Management	4
IS C462	Network Programming	3 0 3	MBA C422	Business and Society	4
IS C471	Computer Graphics	2 2 3	MBA C423	Business Policy and Strategic Management	4
IS C481	Graphical User Interfaces	3 0 3	MBA C424	International Business	4
ITEB G621	Supply Chain Management	4	MBA C471	Management Information Systems	4
SS G512	Object Oriented Programming	4	Electives		
SS G513	Network Security	4	For Engineering & Technology Management		
SS G517	Data Structures and Algorithm Analysis	5	BITS C489	Enterprise Resource Planning	3 0 3
SS G518	Database Design & Application	5	EA C475	Financial Engineering	3 0 3
SS G522	Software Development Standards	4	FIN C413	Risk Management and Insurance	3 0 3
SS G532	Information Theory	4	MBA C414	Technology Management	3 0 3
SS G541	User Interfaces	4	MBA C425	R & D Management	3 0 3
SS G542	Knowledge Management	3	MBA C429	Recent Advances in ETM	4
SS G551	Advanced Compilation Techniques	5	MBA C437	Security Analysis and Portfolio Management	3 0 3
SS G552	Software Testing Methodologies	4	MBA C451	Internetworking Technologies	3 0 3
SS G554	Distributed Data Systems	3 2 5	MBA C454	Project Appraisal	3 0 3
SS G624	Computer Based Simulation and Modelling	5	MBA C482	Creating and Leading Entrepreneurial Organization	3 0 3
SS G641	Management Information and Decision Support Systems	5	MBA C483	Marketing Research	3 0 3
Master of Business Administration			MBA C512	Manufacturing Strategy	4
Named courses			MBA C522	Total Quality Management	4
MBA C311	Business Structure and Processes	4	MBA C523	Project Management	4
MBA C312	Managerial Economics	3	MBA C552	Total Productive Maintenance	4
MBA C313	Business Law	3 0 3	MBA G622	Software Project Management	4
MBA C317	Managerial Skills	1 0 1	For IT Enabled Services Management		
MBA C319	Negotiation Skills and Techniques	2 0 2	BITS C489	Enterprise Resource Planning	3 0 3
MBA C411	Organizational Behaviour	4	EA C474	Retail Management Systems	3 0 3
MBA C412	Human Resource Management	4	FIN C413	Risk Management and Insurance	3 0 3
MBA C413	Quantitative Methods	4	MBA C426	Database Management Systems	4
MBA C414	Technology Management	3 0 3	MBA C427	e-Business and Internet Marketing	4
			MBA C428	Internet Security and Cyber-laws	4
			MBA C433	Advertising and Sales Promotion	3 0 3
			MBA C436	Strategic Financial Management	3 0 3
			MBA C437	Security Analysis and Portfolio Management	3 0 3
			MBA C451	Internetworking Technologies	3 0 3
			MBA C454	Project Appraisal	3 0 3
			MBA C482	Creating and Leading Entrepreneurial Organization	3 0 3

MBA C481	Expert Systems	4	BITS G654	Advanced Instrumentation Techniques	5*
MBA C488	Services Management System	3 0 3			
MBA G622	Software Project Management	4	CHEM C412	Photochemistry and Laser Spectroscopy	3 0 3

Master in Public Health

Named Courses

MPH G510	Biostatistics & Computers in Public Health	5	CHEM C422	Statistical Thermodynamics	3 0 3
MPH G512	Environmental & Occupational Health	4	CHEM C431	Stereochemistry and Reaction Mechanism	3 0 3
MPH G513	Public Health & Diseases	4	CHEM G513	Advanced Nuclear and Radio Chemistry	5*
MPH G515	Communication in Health Care	4	CHEM G521	Environmental Chemistry	5*
MPH G521	Health Care Management	4	CHEM G531	Recent Advances in Chemistry	5*
MPH G522	Preventive Nutrition & Health Promotion	4	CHEM G541	Chemical Applications of Group Theory	5*
MPH G523	Epidemic & Disaster Management	4	CHEM G556	Catalysis	4*
MPH G531	Health Economics & Financial Management	4	CHEM G557	Solid Phase Synthesis and Combinatorial Chemistry	4*
MPH G613	Health Systems and Society	2	CHEM G558	Electronic Structure Theory	5*
MPH G692	Epidemiology	2	CHEM G559	Bioinorganic Chemistry	4*
			CHEM G561	Heterocyclic Chemistry	5*
			CHEM G562	Solid State Chemistry	4*
			CHEM G563	Advanced Statistical Mechanics	5*
			EEE C432	Medical Instrumentation	3 0 3
			PHA G621	Advanced Medicinal Chemistry	2 3 5

Electives

MPH C431	Accounting & Finance	4
MPH G535	Family & Community Health Measures	3
MPH G537	Law & Ethics in Public Health	3
MPH G538	Telemedicine	3
MPH G539	Inter-sectoral co-ordination in Health Services	3
MPH G540	Role of Voluntary Bodies/NGO's in Public Health	3
MPH G661	Research Methodology I	5
MPH G665	Hospital Operations Management	3
MPH G681	Strategic Management	3

M.Phil. Chemistry

Named Courses

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	5*

Electives (any four)

BIO G513	Microbial and Fermentation Technology	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*
-----------	--------------------------	----

* 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
BIO G522	Interferon Technology	2 2 4
BIO G541	Neural Network Analysis	5
BIO G551	Membrane Biology	5
BITS G511	Advanced Project	5
BITS G513	Study in Advanced Topics	5
BITS G514	Environmental Health	3 0 3
BITS G644	Development and use of Computer Software	5
BITS G654	Advanced Instrumentation Techniques	5
CHEM G511	Nuclear and Radio Chemistry	5

CHEM G513	Advanced Nuclear and Radiochemistry	5	MGTS G521	Business Policy - Structure and Organization	5
CHEM G521	Environmental Chemistry	5	MGTS G531	Recent Advances in Organization Behaviour Theory	5
CHEM G531	Recent Advances in Chemistry	5	MGTS G541	Management Information and Decision Support Systems	5
CHEM G541	Chemical Applications of Group Theory	5	MGTS G551	Frontiers in Financial Management	5
CHEM G551	Advanced Organic Chemistry	5	MGTS G561	Institutional Finance & Project Appraisal	5
CHEM G552	Advanced Inorganic Chemistry	5	PHY G511	Theoretical Physics	5
ECON G511	Dynamic Modelling and Control of National Economies	5	PHY G521	Nuclear and Particle Physics	5
ECON G521	Modern Cost Engineering	5	PHY G531	Selected Topics in Solid State Physics	5
ECON G531	Theory of Macroeconomic Policy	5	PHY G541	Physics of Semiconductor Devices	5
ECON G541	Economic Systems Analysis	5	SKILL G611	Computer Operation and Software Development I	5
ENGL G511	Growth of the English Language	5	SKILL G612	Computer Operation and Software Development II	5
ENGL G512	Language and S & T	5	SKILL G621	Computer Maintenance I	5
ENGL G513	Social Impact of S & T	5	SKILL G622	Computer Maintenance II	5
ENGL G521	Principles of Language Teaching	5	SKILL G631	Professional Communication I	5
ENGL G522	Aesthetics and Technology	5	SKILL G632	Professional Communication II	5
ENGL G531	Applied Linguistics	5	SKILL G641	Modern Experimental Methods I	5
ENGL G541	Interpretation of Literature	5	SKILL G642	Modern Experimental Methods II	5
ENGL G551	Information Technology Lab. I	5	SKILL G651	Techniques in Development Management I	5
ENGL G561	Information Technology Lab.II	5	SKILL G652	Techniques in Development Management II	5
ENGL G571	Applied Communication I	5	SKILL G661	Research Methodology I	5
ENGL G581	Applied Communication II	5	SKILL G662	Research Methodology II	5
ENGL G591	Project Formulation and Preparation	5	All courses given above are unstructured. Actual structuring will be done from time to time.		
ENGL G611	Twentieth Century English Literature	5	COMMON COURSES FOR HIGHER DEGREES		
ET G511	Science and Technology Dynamics	5	BITS G529	Research Project I	6
ET G521	Hi-Tech Management	5	BITS G539	Research Project II	6
ET G531	Systems Engineering	5	BITS G619	Professional Practice	4
ET G541	Overview of Technology	5	BITS G620	Professional Practice I	3
HUM G511	Introduction to Health System	3 0 3	BITS G621	Professional Practice II	3
MATH G511	Design and Analysis of Algorithms	5	BITS G629TD	Dissertation	25 (Max.)
MATH G512	Selected Topics in Advanced Mathematics for Engineering Situations	5	BITS G639	Practice School	20
MATH G521	Applied Functional Analysis	5	BITS G649	Reading Course	5
MATH G531	Number Theory	5	BITS G659	Technical Communication	4
MATH G541	Advanced Methods in Discrete Mathematics	5	NOTE : Courses with 4 level numbers given above are advanced level electives from the offering of the Integrated First Degree programmes.		
MATH G611	Algebraic Number Theory	5			
MATH G612	Riemann Surfaces	5			
MATH G621	Fibre Bundles	5			
MATH G622	Algebraic Geometry	5			
MATH G632	Lie Groups & Lie Algebras	5			
MATH G642	Complex Manifolds	5			
MGTS G511	Advanced Marketing Theories and Advertising	5			

COMMON POOL OF ELECTIVES FOR HIGHER DEGREES

BITS G513 Study in Advanced Topics	5
BITS G649 Reading Course	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.

Ph.D. PROGRAMME

Structure

1. Course Work

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.

2. Ph.D. Qualifying Examination

3. Foreign Language when required

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.

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

3. BITS C799T Ph.D. Thesis (Min) 40

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, Distance 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 E512	Computer Applications II	4
BITS E521	Technical Communication I	4
BITS E522	Technical Communication II	4
BITS E531	Social, Behavioral & Economic Sciences I	4
BITS E532	Social Behavioral & Economic Sciences II	4
BITS E533	Modern Experimental Techniques-I	4
BITS E534	Modern Experimental Techniques II	4
BITS E535	Management Methods & Techniques I	4
BITS E536	Management Methods & Techniques II	4
BITS E537	Systems Sciences and Engineering I	4

BITS E538	Systems Science and Engineering II	4
BITS E541	Chemical and Life Science I	4
BITS E542	Chemical and Life Science II	4
BITS E543	Instrumentation Engineering I	4
BITS E544	Instrumentation Engineering II	4
BITS E545	Project and Consultancy I	4
BITS E546	Project and Consultancy II	4
BITS E547	Public Administration I	4
BITS E548	Public Administration II	4
BITS E551	Physical and Mathematical Sciences I	4
BITS E552	Physical and Mathematical Sciences II	4
BITS E561	Use of English for Professional Purposes I	4
BITS E562	Use of English for Professional Purposes II	4
BITS E571	Methods of Planning and Development I	4
BITS E572	Methods of Planning and Development II	4
BITS E573	Study in Advanced Topics I	5
BITS E574	Study in Advanced Topics II	5
BITS E583	Case Studies I	4
BITS E584	Case Studies II	4
BITS E591	Science and Technology Development I	4
BITS E592	Science and Technology Development II	4
BITS E593	Reading Course I	5
BITS E594	Reading Course II	5
BITS E611	Internship I	20
BITS E612	Internship II	20
BITS E661	Research Methodology I	5
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.