

DETAILS OF PROGRAMMES

Legend

AAOC	Analysis and Application Oriented Courses
Bio	Biological Sciences
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
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
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.): Chemical, Civil, Computer Science, Electrical & Electronics, Electronics & Instrumentation, 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-6 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 of this Part. 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 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 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 only which can be taken by students of other programmes only with prior permission from appropriate authority.

BIO C111	General Biology	3 0 3
CHEM C221	General Chemistry	3 0 3
PHY C122	General Physics	3 0 3
SCI C121	Social Hygiene	3 0 3
SCI C212	Applied Nutrition	3 0 3
SCI C311	Agricultural Science	3 0 3

(iii) Core Mathematics

MATH C191	Mathematics I (Advanced Calculus)	3 0 3
MATH C192	Mathematics II (Complex Variables and Linear Algebra)	3 0 3
MATH C222	Discrete Structures for Computer Science	3 0 3
MATH C241	Mathematics III (Differential Equations)	3 0 3

(iv) Technical Arts

TA C111	Engineering Graphics	2 4 4
TA C112	Workshop Practice	2 4 4
TA C162	Computer Programming I	3 0 3
TA C211	Measurement Techniques I	0 4 2
TA C222	Measurement Techniques II	1 6 4
TA C231	Business Communication	3 0 3
TA C252	Computer Programming II	3
TA C312	Technical Report Writing	3

(v) Engineering Science

CE C212	Transport Phenomena I	3 0 3
CE C241	Analysis of Structures	3 0 3
CHE C213	Fluid Flow Operations	3 0 3
CHE C221	Chemical Process Calculations	3 0 3
EEE C272	Circuits & Signals	3 0 3
ES C112	Thermodynamics	3 0 3
ES C221	Mechanics of Solids	3 0 3
ES C232	Transport Phenomena I	3 0 3
ES C241	Electrical Sciences I	3 0 3
ES C242	Structure and Properties of Materials	3 0 3
ES C263	Microprocessors Programming & Interfacing	3 2 4
ES C272	Electrical Sciences II	3 0 3
INSTR C272	Circuits & Signals	3 0 3
ME C211	Applied Thermodynamics	3 0 3
ME C212	Transport Phenomena I	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.

ENGG C111	Electrical and Electronics Technology	3 0 3
ENGG C212	Introduction to Systems	3 0 3
ENGG C232	Engineering Materials	3 0 3
ENGG C241	Mechanical Technology	3 0 3
ENGG C242	Maintenance & Safety	3 0 3
ENGG C264	Fluid and Solid Mechanics	3 0 3
ENGG C272	Process Technology	3 0 3
ENGG C282	Industrial Engineering Techniques	3 0 3
ENGG C291	Electronics and Instrumentation Technology	3 0 3
ES C261	Digital Electronics and Microprocessors	3 0 3

(vi) Analysis and Application Oriented Courses

AAOC C111	Probability and Statistics	3 0 3
AAOC C221	Graphs & Networks	3 0 3
AAOC C222	Optimisation	3 0 3

AAOC C311	Data Processing	3 0 3
AAOC C312	Operations Research	3 0 3
AAOC C321	Control Systems	3 0 3
AAOC C322	Systems	3 0 3
AAOC C341	Numerical Analysis	3 0 3
BIO C391	Instrumental Methods of Analysis	4
CHEM C391	Instrumental Methods of Analysis	4
PHA C391	Instrumental Methods of Analysis	4
PHY C391	Instrumental Methods of Analysis	4

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

TOC C112	Book Keeping	3 0 3
TOC C211	Book Keeping & Accountancy	3 0 3
TOC C212	Library Science	3 0 3
TOC C213	Civil Engineering Practice	3
TOC C223	Comfort Conditioning and Refrigeration	3
TOC C224	Corporate Taxation	3 0 3
TOC C235	Electrical and Electronics Engineering Practice	0 6 3
TOC C236	Electronics and Instrumentation Engineering Practice	0 6 3
TOC C244	Production and Processing	0 6 3
TOC C253	Computer Oriented Problem Solving I	3
TOC C254	Computer Oriented Problem Solving II	3

(vii) Humanities & Social Sciences (HSS) and Other Courses**A. HSS Courses**

ECON C211	Fundamentals of Finance and Accounting	3 0 3
ECON C212	Principles of Economics	3 0 3
HIST C112	Main Trends in Indian History	3 0 3
HIST C211	Main Currents of Modern History	3 0 3
HSS C231	Economic Legislation	3 0 3
HSS C232	Indian Financial Systems	3 0 3
HSS C241	Legal Environment of Business	3 0 3
HSS C311	Taxation	3 0 3
HSS C312	Bureaucracy	3 0 3
HSS C313	Critical Analysis of Literature and Cinema	3 0 3
HSS C314	Print and Audio Visual Advertising	3 0 3

HSS C321	Commercial Law	3 0 3	BITS C342	Object Oriented Programming	3 0 3
HUM C232	Indian Financial System	3 0 3	BITS C372	Data Communications and Networks	3 0 3
HUM C311	Journalism	3	BITS C381	TIC Projects	3
HUM C312	Contemporary India	3 0 3	BITS C382	Reading Course	3
HUM C321	Appreciation of Indian Music	3 0 3	BITS C383	TIC Projects	3
HUM C322	Commercial Art	3	BITS C385	Introduction to Gender Studies	3 0 3
HUM C331	Appreciation of Art	3 0 3	BITS C386	Quantum Information and Computation	3 0 3
HUM C332	Cinematic Art	3	BITS C432	Entrepreneurship	3 0 3
HUM C341	Comparative Indian Literature	3 0 3	BITS C461	Software Engineering	3
HUM C342	Graphic Art	3	BITS C462	Renewable Energy	3 0 3
HUM C351	Public Administration	3 0 3	BITS C463	Cryptography	3 0 3
HUM C352	Painting	3	BITS C464	Machine Learning	3 0 3
HUM C361	Accounting in Management	3 0 3	BITS C471	Management Information Systems	3 0 3
HUM C362	History of Mathematics	3 0 3	BITS C472	e-Business	3 0 3
HUM C371	Linguistics	3 0 3	BITS C473	Nonlinear Dynamics and Chaos	3 0 3
HUM C372	Phonetics and Spoken English	3 0 3	BITS C474	Rural Infrastructure Planning	3 0 3
HUM C381	Musicology - An Introduction	3 0 3	BITS C481	Computer Networks	3 0 3
HUM C382	Sankara's Thoughts	3 0 3	BITS C482	Creating and Leading Entrepreneurial	3 0 3
HUM C383	Srimad Bhagavad Gita	3 0 3	BITS C483	Indian Wisdom for Modern Management	3 0 3
HUM C411	Professional Ethics	3 0 3	BITS C484	Introduction to Conflict Management	3 0 3
HUM C412	Heritage of India	3 0 3	BITS C485	Marketing Audit	3 0 3
HUM C413	Indian Traditions of Science and Technology	3 0 3	BITS C486	Product & Brand Management	3 0 3
HUM C421	Comparative Religion	3 0 3	BITS C487	Global Business, Technology & Knowledge Sharing	3 0 3
HUM C422	Aesthetics	3 0 3	BITS C488	Services Management Systems	3 0 3
HUM C431	Theatre Art-Acting and Production	3 0 3	CHEM C212	Colloid and Surface Chemistry	3 0 3
MGTS C211	Principles of Management	3 0 3	CHEM C231	Chemistry Project Laboratory	3
PHIL C211	Introductory Philosophy	3 0 3	MATH C231	Number Theory	3 0 3
PHIL C221	Symbolic Logic	3 0 3	PHY C231	Physics Project Laboratory	3
POL C211	Indian National Movement	3 0 3	PHY C232	Computational Physics	3 0 3
POL C212	Modern Political Concepts	3 0 3	PHY C241	Atmospheric Physics	3 0 3
POL C311	Gandhian Thoughts	3 0 3	PHY C242	Theory of Relativity	3 0 3
POL C312	Marxian Thoughts	3 0 3			
POL C321	International Relations	3 0 3			
PSY C211	Introduction Psychology	3 0 3			
PSY C311	Psychology of Human Adjustment	3 0 3			
SOC C211	Dynamics of Social Change	3 0 3			

B. Other Courses

BIO C231	Biology Project Laboratory	3
BITS C224	Corporate Taxation	3 0 3
BITS C313	Lab. Oriented Project	3
BITS C314	Lab. Oriented Project	3
BITS C323	Study Oriented Project	3
BITS C324	Study Oriented Project	3
BITS C331	Computer Projects	3
BITS C332	Culture and Significance of Modern Mathematics	3 0 3
BITS C333	Project on Organisational Aspects	3
BITS C334	Project on Organisational Aspects	3
BITS C335	Computer Projects	3
BITS C341	Selected Computer Languages	3

The following courses on Development Process (CDP) are specially designed for Group C only which cannot be taken by Groups A & B students under any circumstances.

CDP C211	Agricultural Growth of India	3 0 3
CDP C212	Industrial Growth of India	3 0 3
CDP C221	Growth of Social Health in India	3 0 3
CDP C231	Transport & Communication	3 0 3
CDP C313	Security Analysis & Portfolio Management	3 0 3
CDP C323	Functions & Working of Stock Exchanges	3 0 3
CDP C332	Contemporary India	3 0 3

CDP C364	Industrial Relations	3 0 3
CDP C371	Development Economics	3 0 3

(viii) Electives

While Table on page IV-6 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
EA C413	Intelligent Manufacturing System	3 0 3
EA C414	Introduction to Bioinformatics	3 0 3
EA C415	Introduction to MEMS	4
EA C416	Introduction to Nanoscience	303
EA C422	Fibre Optics and Optoelectronics	3
EA C441	Robotics	3
EA C442	Remote Sensing and Image Processing	3
EA C443	Image Processing	3 0 3
EA C451	Internetworking Technologies	3 0 3
EA C452	Mobile Telecommunication Networks	3 0 3
EA C461	Artificial Intelligence	3
EA C462	Superconductivity Theory and Applications	3 0 3
EA C463	Neural Networks and Applications	3 0 3
EA C471	Pattern Recognition	3
EA C472	Photovoltaic Devices	3 0 3
EA C473	Multimedia Computing	3 0 3
EA C481	Expert Systems	3
EA C482	Fuzzy Logic and Applications	3 0 3

While each programme has a unique number of courses under the 'elective' category, the option embedded in the range shown against each category in the category-wise chart may not be mistaken to be an 'elective'. Thus each student is required to take courses within the range of minimum to maximum from the uniquely named courses in each category. The list is not open-ended and is also not negotiable. For fulfil-

ling 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 programme, provided he 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 short term electives given below are available for all A, B and C group programmes which may only be taken as additional elective over and above the normal requirements of electives in a programme and whose units may be one or two depending upon the nature and the duration of the course:

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 N101T	Hindustani Classical Music (Vocal) I	3
MUSIC N102T	Hindustani Classical Music (Vocal) II	3
MUSIC N201T	Hindustani Classical Music (Vocal) III	3
MUSIC N202T	Hindustani Classical Music (Vocal) IV	3
MUSIC N111T	Hindustani Classical Music (Instrumental) I	3
MUSIC N112T	Hindustani Classical Music (Instrumental) II	3

MUSIC N211T	Hindustani Classical Music (Instrumental) III	3
MUSIC N212T	Hindustani Classical Music (Instrumental) IV	3
RUS N101T	Beginning Russian	3 0 3
RUS N102T	Technical Russian	3 0 3

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 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 programmes 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 a 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.

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

Pattern 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, Pharm)	ME	C212	
	BIO	C241	Microbiology (For Bio)	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)	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, EI)
	TA	C211	Measurement Techniques I (For Econ, Engg, Exptl Sc, Math, Pharm)	INSTR	C272	
	TA	C312	Technical Report Writing (For Engg) 1 (For Chem, Math)	ES	C263	Microprocessor Programming & Interfacing (For CS, EEE, EI)
				MATH	C222	Discrete Structures for Computer Science (For CS)
				ME	C211	Applied Thermodynamics (For Mech)
				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, Exptl Sc, Math, Pharm)	
			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 Civil, Mech., CS)
	AAOC	C311	Data Processing (For Econ, Math)	AAOC	C341	Numerical Analysis (For Che, EEE, EI, Exptl. Sc., Math)
	AAOC	C321	Control Systems (For Che, EEE, EI)	Elective	1	(For Econ, Pharm)
	AAOC	C341	Numerical Analysis (For Civil, Mech., 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 Chem, Econ, Engg, Math, Phy)	OR		
				BITS	C422T-	Thesis
					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 in Part – V.

Pattern 2 Semesterwise 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, EI, Math, Mech.)		ES C272 Electrical Sciences II AAOC C312 Operations research AAOC C321 Control Systems (For Civil, Mech, CS) AAOC C341 Numerical Analysis (For Che, EEE, EI, Exptl Sc., Math) CE C212 } Transport Phenomena I (For Civil, ME C212 } Mech) 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, EI) INSTR C272 } ES C263 Microprocessor Programming & Interfacing (For CS, EEE, 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., CS) BIO C391 } Instrumental Methods of Analysis (For CHEM C391 } Exptl Sc, Pharm) PHA C391 } PHY C391 } Elective 1 (For Che, Civil, CS, EEE, EI, Mech, Pharm) Electives 2 (For Econ, Math, Exptl Sc)		Compulsory Discipline Courses* Electives 2
V	BITS C412 Practice School II OR BITS C422T Thesis C442T Seminar		

Pattern 1 is currently operative pattern as Semesterwise Pattern for Students Admitted to Group C. It may be changed 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 in Part – V.

M.Sc. (Tech.) Engineering Technology, Information Systems , Finance admitted in First Semester						
Year	First Semester			Second Semester		
I	CHEM	C141	Chemistry-I	AAOC	C111	Probability & Statistics
	ES	C112	Thermodynamics	CHEM	C142	Chemistry-II
	BIO	C111	General Biology	MATH	C192	Mathematics II
	MATH	C191	Mathematics I	PHY	C132	Physics-II
	PHY	C131	Physics-I	TA	C112	Workshop Practice
	TA	C111	Engineering Graphics	TA	C162	Computer Programming I
II	ECON	C212	Principles of Economics	ENGG	C212	Introduction to Systems
	ENGG	C111	Electrical and Electronics Technology	ES	C261	Digital Electronics and Microprocessors (for ET, IS)
	ENGG	C241	Mechanical Technology (for ET, IS)	MGTS	C211	Principles of Management
	ENGG	C264	Fluid & Solid Mechanics (for ET)	TA	C312	Technical Report Writing
	TA	C252	Computer Programming II	TOC	C223	Comfort Conditioning & Refrigeration (for ET)
	TOC	C213	Civil Engineering Practice (for ET)	TOC	C244	Production & Processing (for ET)
	TOC	C235	Electrical & Electronics Engineering Practice (for ET,IS)	TOC	C224	Corporate Taxation (for Fin.)
	AAOC	C221	Graphs & Networks (for IS)	MATH	C222	Discrete Structures for Computer Science (for IS)
	AAOC	C311	Data Processing (for Fin.)	SOC	C211	Dynamics of Social Change (for IS, Fin.)
	PHIL	C221	Symbolic Logic (for IS)	ECON	C211	Fundamentals of Finance & Accounting (for Fin.)
	HSS	C241	Legal Environment of Business (for Fin.)			
	HUM	C351	Public Administration (for Fin.)			
	TA	C231	Business Communication (for Fin.)			
	Summer	BITS C221 Practice School I 5 Units (For PS Option Only)				
III	Compulsory Discipline Courses*			Compulsory Discipline Courses*		
	AAOC	C222	Optimization	AAOC	C312	Operations Research
	ENGG	C232	Engineering Materials (for ET)	CDP	C364	Industrial Relations (for ET)
	ENGG	C242	Maintenance and Safety (for ET)	AAOC	C341	Numerical Analysis (for IS)
	BITS	C342	Object oriented programming (for IS)	BITS	C471	Management Information Systems (for Fin.)
	CDP	C323	Functions and Working of Stock Exchanges (for Fin.)	CDP	C313	Security Analysis and Portfolio Management (for Fin.)
	Elective (s)	1 (For IS, Fin.)				
IV	Elective(s) 5			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 in Part – V.

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				

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* 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 in Part – V.

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)								
Summer								
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				3
				18				18
IV					BITS	C412	Practice School II OR	20
	Elective(s)	6		18	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
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

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	# ECON C362	Money, Banking and Financial Markets ²	3 0 3
CE C417	Applications of Artificial Intelligence in Civil Engineering	3 0 3	# ECON C372	International Trade and Balance of Payments ²	3 0 3
CE C418	Introduction to Water Resources Engineering	3 0 3	ECON C411	Project Appraisal	3 0 3
CE C419	Geotechnical Earthquake Engineering and Machine Foundation	3 0 3	ECON C412	Security Analysis & Portfolio Management	3 0 3
CE C422	Design of Bridge Structures	3 0 3	ECON C422	Functions & Working of Stock Exchanges	3 0 3
CE C432	Structural Dynamics	3 0 3	ECON C431	Regional Economics	3 0 3
CE C441	Design of Water Resources Systems	3 0 3	ECON C451	Technology Forecasting	3 0 3
CE C461	Refrigeration and Air Conditioning	3 0 3	ECON C461	Analysis of Indian Economy	3 0 3
CE C471	Introduction to Finite Element Methods	3 0 3	ECON C471	Resources and Environmental Economics	3 0 3
CE C491	Special Projects	3	ECON C481	Financial Management	3 0 3
			ECON C491	Special Projects	3
Computer Science			Electrical & Electronics Engineering		
CS C321	Computers and Programming	3 2 4	CS C341	Data Structures & Algorithms	3 0 3
# CS C341	Data Structures and Algorithms ¹	3 0 3	# EEE C364	Analog Electronics ²	3 3 4
# CS C342	Advanced Computer Organization ²	3 0 3	# EEE C371	Electromechanical Energy Conversion ¹	3 3 4
# CS C351	Theory of Computation ¹	3 0 3	* EEE C374	Power Systems	3 0 3
# CS C352	Data Base Systems ²	3 0 3	# EEE C381	Electronic Devices & Integrated Circuits ¹	3 0 3
# CS C362	Programming Languages & Compiler Construction ²	3 0 3	# EEE C383	Communication Systems ²	3 3 4
# CS C372	Operating Systems ¹	3 0 3	# EEE C391	Digital Electronics and Computer Organization ¹	3 3 4
# CS C391	Digital Electronics and Computer Organization ¹	3 3 4	* EEE C414	Telecommunication Switching Systems & Networks	3 0 3
CS C414	Telecommunication Switching Systems & Networks	3 0 3	EEE C415	Digital Signal Processing	3 0 3
CS C415	Data Mining	3 0 3	EEE C416	Digital Communication	3 0 3
CS C422	Parallel Computing	3 0 3	EEE C417	Computer Based Control Systems	3 0 3
CS C424	Software for Embedded Systems	3 0 3	EEE C418	Digital Systems	3 0 3
CS C441	Selected Topics from Computer Science	3	EEE C422	Modern Control Systems	3 0 3
CS C442	Advanced Algorithms & Complexity	3 0 3	EEE C423	Combinatorial Mathematics	3 0 3
CS C444	Real-Time Systems	3 0 3	# EEE C424	Microelectronic Circuits ¹	3 0 3
CS C446	Data Storage Technologies and Networks	3 0 3	EEE C432	Medical Instrumentation	3 0 3
CS C451	Combinatorial Mathematics	3 0 3	* EEE C433	Electromagnetic Fields & Waves	3 0 3
CS C453	Discrete Mathematical Structures	3 0 3	EEE C441	Television Engineering	3 0 3
# CS C461	Computer Networks ²	3 0 3	* EEE C443	Analog & Digital VLSI Design	3 0 3
CS C471	Computer Graphics	2 2 3	EEE C444	Real-Time Systems	3 0 3
CS C481	Graphical User Interfaces	3 0 3	EEE C452	Electromagnetic Fields & Microwave Engineering	3 0 3
CS C491	Special Projects	3	EEE C453	Discrete Mathematical Structures	3 0 3
Economics			* EEE C461	Power Electronics	3 0 3
# ECON C311	Microeconomics ¹	3 0 3	EEE C462	Advanced Power Systems	3 0 3
# ECON C321	Macroeconomics ¹	3 0 3	EEE C471	Electronic Measurements and Instrumentation	3 0 3
# ECON C322	Public Finance: Theory and Practice ²	3 0 3	EEE C472	Satellite Communication	3 0 3
# ECON C341	Economics of Growth & Planning ¹	3 0 3	EEE C491	Special Projects	3
# ECON C342	Econometrics ²	3 0 3	Electronics & Instrumentation		

CS C341	Data Structures & Algorithms	3 0 3	FIN C331	Management Accounting	3 0 3
* EEE C381	Electronic Devices & Integrated Circuits	3 0 3	# FIN C332	Econometrics ²	3 0 3
# INSTR C312	Industrial Instrumentation and Control ²	3 0 3	# FIN C342	Financial Management ¹	3 0 3
# INSTR C313	Microelectronic Circuits ¹	3 0 3	FIN C411	Project Appraisal	3 0 3
# INSTR C355	Electronic Instruments and Instrumentation Technology ²	3 3 4	FIN C413	Risk Management and Insurance	3 0 3
# INSTR C364	Analog Electronics ²	3 3 4	FIN C421	Financing International Trade	3 0 3
* INSTR C371	Electromechanical Energy Conversion	3 3 4	FIN C422	Public Finance: Theory and Practice	3 0 3
# INSTR C381	Transducers & Measurement Systems ¹	3 0 3	FIN C424	Money Banking and Financial Markets	3 0 3
# INSTR C391	Digital Electronics and Computer Organization ¹	3 3 4	FIN C431	Marketing	3 0 3
* INSTR C392	Analysis Instrumentation	3 0 3	FIN C432	Issues in Indian Economy	3 0 3
INSTR C411	Opto-Electronic Instruments	3 0 3	FIN C433	Advertising & Sales Promotion	3 0 3
INSTR C414	Telecommunication Switching Systems & Networks	3 0 3	FIN C441	Organisational Behaviour	3 0 3
INSTR C421	Digital Systems	3 0 3	FIN C442	Corporate Planning	3 0 3
INSTR C444	Real-Time Systems	3 0 3	FIN C451	International Business	3 0 3
* INSTR C451	Process Control	3 0 3	FIN C462	Services Marketing	3 0 3
* INSTR C461	Power Electronics	3 0 3	FIN C491	Special Projects	3
* INSTR C471	Electronic Measurements and Instrumentation	3 0 3	Information Systems		
INSTR C481	Medical Instrumentation	3 0 3	IS C311	Computer Concepts and Software Systems	3 0 3
INSTR C491	Special Projects	3	IS C321	Program, Data & File Structures	3 0 3
Engineering Technology			# IS C332	Database Systems and Applications ²	3 0 3
# ET C341	Instrumentation and Control	3 0 3	# IS C341	Software Engineering ²	3
# ET C342	Materials Management ²	3 0 3	# IS C342	Structures of Programming Languages ²	3 0 3
# ET C351	Chemical Process Technology ²	3 0 3	# IS C351	Computer Organization and Architecture ¹	3 2 4
# ET C352	Energy Management ²	3 0 3	# IS C352	Management Information Systems ¹	3 0 3
# ET C362	Environmental Pollution Control ¹	3 0 3	# IS C361	Data Structures and Algorithms ¹	3 0 3
ET C411	Concepts of Engineering Design	3	# IS C362	Operating Systems ²	3 0 3
# ET C412	Production Planning & Control ¹	3 0 3	IS C411	Information Systems Project	3
ET C413	Advances in Materials Science	3 0 3	IS C415	Data Mining	3 0 3
# ET C414	Project Appraisal ¹	3 0 3	IS C421	Modelling and Decision Systems	3 0 3
ET C421	Computer Aided Project Planning and Monitoring	3	IS C422	Parallel Computing	3 0 3
ET C422	Computer Aided Manufacturing	3 0 3	IS C424	Software for Embedded Systems	3 0 3
ET C431	Technology Forecasting	3 0 3	IS C431	Educational Software	1 4 3
ET C432	Quality Control, Assurance & Reliability	3 0 3	IS C444	Real Time Systems	3 0 3
ET C441	Technology Management	3 0 3	IS C446	Data Storage Technologies and Networks	3 0 3
ET C491	Special Projects	3	IS C446	Data Storage Techniques and Networks	3 0 3
Finance			IS C461	Computer Networks	3 0 3
# FIN C311	Merchant Banking ¹	3 0 3	IS C462	Network Programming	3 0 3
# FIN C312	International Financial Markets and Services ²	3 0 3	IS C471	Computer Graphics	2 2 3
# FIN C321	Theory of Finance ¹	3 0 3	IS C472	Geographical Information Systems	3 0 3
# FIN C322	Project Finance ²	3 0 3	IS C481	Graphical User Interfaces	3 0 3
			Mathematics		
			# MATH C311	Algebra I ¹	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	# PHA C332	Pharmacology and Toxicology ²	2 3 3
# MATH C331	Introduction to Topology ¹	3 0 3	# PHA C342	Medicinal Chemistry ²	2 3 3
# MATH C332	Introduction to Functional Analysis ²	3 0 3	PHA C411	Physical Pharmacy	2 3 3
# MATH C352	Differential Geometry ²	3 0 3	1 PHA C412	Veterinary Pharmacy	3 0 3
MATH C411	Complex Analysis	3 0 3	2 PHA C415	Pharmaceutical management & Quality Control	3 0 3
MATH C412	Concepts of Geometry	3 0 3	PHA C414	Biopharmaceutics	3 0 3
MATH C413	Topological Groups	3 0 3	PHA C415	Pathophysiology	3 0 3
MATH C421	Combinatorial Mathematics	3 0 3	PHA C416	Chemistry of Synthetic Drugs	3 0 3
MATH C422	Algebraic & Differential Topology	3 0 3	PHA C417	Pharmacoeconomics	3 0 3
MATH C431	Distribution Theory	3 0 3	# PHA C421	Pharmaceutical Formulations and Bio-pharmaceutics ²	2 3 3
MATH C441	Discrete Mathematical Structures	3 0 3	PHA C422	Cosmetic Science	2 3 3
MATH C451	Ordinary Differential Equations	3 0 3	PHA C431	Pharmacognosy	2 3 3
MATH C452	Partial Differential Equations	3 0 3	PHA C432	Hospital Pharmacy	3 0 3
MATH C461	Integral Equations	3 0 3	PHA C441	Biochemical Engineering	3 0 3
MATH C471	Non-Linear Optimisation	3 0 3	PHA C442	Applied Pharmaceutical Chemistry	3 0 3
MATH C481	Commutative Algebra	3 0 3	PHA C461	Phytochemistry	2 3 3
MATH C491	Special Projects	3	PHA C491	Special Projects	3
Mechanical Engineering			Physics		
# ME C312	Design of Machine Elements ¹	3 0 3	# PHY C311	Electromagnetic Theory I ¹	3 0 3
# ME C314	Power Plant Engineering ²	3 0 3	# PHY C312	Statistical Mechanics ²	3 0 3
# ME C331	Transport Phenomena II ¹	3 2 4	# PHY C321	Quantum Mechanics I ¹	3 0 3
# ME C332	Prime Movers and Fluid Machines ²	3 2 4	# PHY C322	Solid State Physics ²	3 0 3
# ME C342	Production Techniques ¹	3 2 4	# PHY C332	Methods of Mathematical Physics I ¹	
# ME C382	Computer Aided Design ²	3	# PHY C341	Nuclear Physics ²	3 0 3
# ME C392	Advanced Mechanics of Solids & Kinematics ¹	3 0 3	* PHY C351	Methods of Experimental Physics	2 3 3
ME C412	Production Planning & Control	3 0 3	# PHY C352	Atomic & Molecular Spectroscopy ²	3 0 3
# ME C422	Dynamics of Machines & Vibrations ²	3 0 3	* PHY C353	Optical Physics & Applications	3 0 3
ME C432	Computer Aided Manufacturing	3 0 3	PHY C362	Particle Physics	3 0 3
ME C441	Automotive Vehicles	3 0 3	PHY C411	Electromagnetic Theory II	3 0 3
ME C442	Advances in Materials Science	3 0 3	PHY C421	Quantum Mechanics II	3 0 3
ME C443	Quality Control, Assurance and Reliability	3 0 3	PHY C422	Group Theory and Applications	3 0 3
ME C451	Mechanical Equipment Design	3 0 3	PHY C432	Laser and Applications	3 0 3
ME C452	Composite Materials & Design	3 0 3	PHY C441	Physics Laboratory	0 9 3
ME C461	Refrigeration and Airconditioning	3 0 3	PHY C451	Materials Science	3 0 3
ME C472	Precision Engineering	3 0 3	PHY C461	Process Analysis Instrumentation	3 0 3
ME C481	Project Appraisal	3 0 3	PHY C471	Astrophysics	3 0 3
ME C491	Special Projects	3	PHY C491	Special Projects	3
Pharmacy			General Studies		
# PHA C311	Natural Drugs ¹	2 3 3	It should be noted that there is no clearly defined set of so-called discipline courses in respect of the General Studies programme. The courses drawn from those listed under Humanities, Social sciences and Other courses category and the Science and Applied Sciences category would meet such requirements. The Senate appointed 1.08 Committee decides the courses from time to time.		
# PHA C312	Forensic Pharmacy ²	3 0 3			
# PHA C321	Anatomy Physiology & Hygiene ¹	2 3 3			
# PHA C322	Dispensing Pharmacy ¹	2 3 3			
# PHA C331	Industrial Pharmacy ¹	2 3 3			

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

**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			Elective 2		
IV	Second Degree Compulsory Discipline Courses* Electives 3			Second Degree Compulsory Discipline Courses* Electives 2		
V	BITS	C413	Practice School II OR Thesis Seminar	BITS	C422T	Thesis Seminar
	BITS	C421T		BITS	C442T	OR
	BITS	C441T		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 in Part – V.

**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) 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 in Part – V.

**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	AOC 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	AOC 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* AOC C221 Graphs and Networks (For Math) AOC C311 Data processing (For Econ., Math) PHA C391 Instrumental Methods of Analysis PHY C212 Classical Mechanics (For Phy)	First Degree Compulsory Discipline Courses* AOC 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 in Part – V.

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 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		
II	BIO	G642	Experimental Techniques	5	BITS	G629T	Dissertation	16		
	BITS	G621	Professional Practice II	3			OR			
			Elective	*	BITS	G639	Practice School	20		
		Elective	*							
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	G551	Advanced Separation Technology	5	CHE	G614	Advanced Heat Transfer	5		
	CHE	G613	Advanced Mass Transfer	5	CHE	G641	Reaction Engineering	5		
II	BITS	G621	Professional Practice II	3	BITS	G629T	Dissertation	16		
	CHE	G522	Polymer Technology	4			OR			
			Elective	*	BITS	G639	Practice School	20		
		Elective	*							
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		
II	BITS	G621	Professional Practice II	3	BITS	G629T	Dissertation	16		
	IS	C472	Geographical Information System	3			OR			
			Elective	*	BITS	G639	Practice School	20		
		Elective	*							
<p>* <i>Minimum 3 Units</i></p> <p>Note: This is the suggested semesterwise pattern by the appropriate Senate appointed committee, subject to change if the situation warrants.</p>										

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	G513	Advance Computational Techniques Elective	4*
	CE	G619	Finite Element Analysis	5				
II	BITS	G621	Professional Practice II	3	BITS	G629T	Dissertation	16
			Elective	*	BITS	G639	Practice School	20
			Elective	*				
		Elective	*					
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
II	BITS	C621	Professional Practice II	4	BITS	G629T	Dissertation	16
	CE	G524	Urban Mass Transit Planning, Operations and Management	4	BITS	G639	Practice School	20
	CE	G532	Project Planning and Management	4				
			Elective	*				
		Elective	*					
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
II	BITS	G621	Professional Practice II	3	BITS	G629T	Dissertation	16
	EEE	C472	Satellite Communication	3	BITS	G639	Practice School	20
			Elective	*				
		Elective	*					
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
II	BITS	G621	Professional Practice II	3	BITS	G629T	Dissertation	16
	EEE	G512	Embedded System Design	4	BITS	G639	Practice School	20
			Elective	*				
		Elective	*					

* 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		
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	*							
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		
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	*							
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		
II	BITS	G621	Professional Practice II	3	BITS	G629T	Dissertation	16		
			Elective	*			OR			
			Elective	*	BITS	G629T	Practice School	20		
		Elective	*							
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		
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	*							

* 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		
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	*							
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		
II	BITS	G621	Professional Practice II	3	BITS	G629T	Dissertation	16		
	DE	G531	Product Design	5			OR			
			Elective	*	BITS	G639	Practice School	20		
		Elective	*							
Pharmacy										
I	BITS	G659	Technical Communication	4	BITS	G620	Professional Practice I	3		
	PHA	G532	Quality Assurance & Regulatory Affairs	5	PHA	G613	Pharmaceutical Biotechnology	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		
II	BITS	G621	Professional Practice II	3	BITS	G629T	Dissertation	16		
	PHA	G611	Advanced Pharmacology	5			OR			
			Elective	*	BITS	G639	Practice School	20		
		Elective	*							
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	*		
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	*							

* 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
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						
II	MBA	C422	Business and Society	4	BITS	G561	Dissertation		16	
	MBA	C423	Business Policy & Strategic Management	4			OR			
	MBA	C424	International Business Elective(s)	3 12	BITS	G560	Practice School		20	

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
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
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	*
III	BITS	G629T	Dissertation	16				
			OR					
	BITS	G639	Practice School	20				
Chemical								
I					BITS	G659	Technical Communication	4
					CHE	G542	Computational Transport Phenomena	5
					CHE	G614	Advanced Heat Transfer	5
					CHE	G641	Reaction Engineering	5
II	BITS	G620	Professional Practice I	3	BITS	G621	Professional Practice II	3
	CHE	G541	Process Plant Simulation	4	CHE	G522	Polymer Technology	4
	CHE	G551	Advanced Separation Technology	5			Elective	*
	CHE	G613	Advanced Mass Transfer	5			Elective	*
III	BITS	G629T	Dissertation	16				
			OR					
	BITS	G639	Practice School	20				
Civil – Infrastructure Systems								
I					BITS	G659	Technical Communication	4
					CE	G516	Multicriteria Analysis in Engineering	4
					CE	G517	Waste Management Systems	4
					CE	G520	Infrastructure Planning and Management	4
II	BITS	G620	Professional Practice I	3	BITS	G621	Professional Practice II	3
	CE	G515	Fundamentals of Systems Engineering	4	IS	C472	Geographical Information System	3
	CE	G523	Transportation Systems Planning and Management	4			Elective	*
	CE	G525	Water Resources Planning and Management	4			Elective	*
III	BITS	G629T	Dissertation	16				
			OR					
	BITS	G639	Practice School	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	*
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	*
III	BITS	G629T	Dissertation	16				
			OR					
	BITS	G639	Practice School	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
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	*
III	BITS	G629T	Dissertation	16				
			OR					
	BITS	G639	Practice School	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
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	*
III	BITS	G629T	Dissertation	16				
			OR					
	BITS	G639	Practice School	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
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	
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	*		
III	BITS G629T	Dissertation	16					
	OR							
	BITS G639	Practice School	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	
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	*		
III	BITS G629T	Dissertation	16					
	OR							
	BITS G639	Practice School	20					
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	
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	*		
III	BITS G629T	Dissertation	16					
	OR							
	BITS G639	Practice School	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							
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Year	First Semester			U	Second Semester			U
Pharmacy								
I					BITS PHA PHA PHA	G659 G614 G621 G632	Technical Communication Clinical Pharmacy & Therapeutics Advanced Medicinal Chemistry Dosage Form Design	4 5 5 5
II	BITS PHA PHA	G620 G532 G611 G612	Professional Practice I Quality Assurance & Regulatory Affairs Advanced Pharmacology Pharmacokinetics & Clinical Pharmacy	3 5 5 5	BITS PHA	G621 G613	Professional Practice II Pharmaceutical Biotechnology Elective Elective	3 5 * *
III	BITS BITS	G629T G639	Dissertation OR Practice School	16 20				
Software System								
I					BITS BITS SS SS	C481 G659 G514 G515	Computer Networks Technical Communication Object Oriented Analysis & Design Data Warehousing	3 4 4 5
II	BITS SS SS SS	G620 G531 G653 G562	Professional Practice I Pervasive Computing Software Architecture Software Engineering & Management	3 4 5 5	BITS SS	G621 G516	Professional Practice II Comp. Organization & Software Systems Elective Elective	3 5 * *
III	BITS BITS	G629T G639	Dissertation OR Practice School	16 20				
Master of Business Administration								
I					MBA MBA MBA MBA MBA MBA	C311 C312 C411 C418 C319 C412	Business Structure & Processes Managerial Economics Organisational Behaviour Marketing Negotiation Skills & Techniques Human Resource Management Elective(s)	4 3 4 4 2 4 3
II	MBA MBA MBA MBA MBA	C317 C417 C415 C413 C313 C422	Managerial Skills Managerial Communication Financial & Management Accounting Quantitative Methods Business Law Business and Society Elective(s)	1 4 4 4 3 4 6	MBA MBA MBA MBA	C423 C416 C419 C471 C421 C424	Business Policy & Strategic Management Corporate Finance & Taxation Production & Operations Management Management Information Systems Supply Chain Management International Business Elective(s)	4 4 4 3 4 3 3
III	BITS BITS	G561 G560	Dissertation OR Practice School	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 4
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 Biomodeling	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 G522	Polymer Technology	4
CHE G541	Process Plant Simulation	4

CHE G542	Computational Transport Phenomena	5
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CHE G551	Advanced Separation Technology	5
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CHE G613	Advanced Mass Transfer	5
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CHE G614	Advanced Heat Transfer	5
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CHE G641	Reaction Engineering	5
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Electives (any two)

CHE C412	Process Equipment Design	3 0 3
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CHE C413	Process Plant Safety	3 0 3
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CHE C421	Biochemical Engineering	3 0 3
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CHE C422	Combustion Engineering	3 0 3
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CHE C441	Process Control	3 0 3
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CHE C471	Refrigeration and Air Conditioning	3 0 3
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CHE G511	Fluidization Engineering	4
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CHE G512	Petroleum Refining & Petrochemicals	4
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CHE G513	Environmental Management Systems	5
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CHE G514	Evolutionary Computation	5
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CHE G521	Chemical Engineering Analysis	4
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CHE G531	Project Engineering	4
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CHE G532	Alternate Energy Resources	4
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CHE G611	Computer Aided Analysis and Design	5
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CHE G621	Fluid Dynamics	5
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CHE G622	Advanced Chemical Engineering Thermodynamics	5
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Civil with Specialization in Infrastructure Systems

Named Courses

CE G515	Fundamentals of Systems Engineering	4
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CE G516	Multicriteria Analysis in Engineering	4
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CE G517	Waste Management System	4
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CE G520	Infrastructure Planning and Management	4
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CE G523	Transportation Systems Planning and Management	4
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CE G525	Water Resources Planning and Management	4
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IS C472	Geographical Information System	3 0 3	CE G619	Finite Element Analysis	5
Electives (any two)			Electives (any four)		
BITS C474	Rural Infrastructure Planning	3 0 3	CE G511	Matrix Method in Civil Engineering	5
CE G512	Topics in Environmental Engineering	4	CE G514	Structural Optimization	4
CE G513	Advanced Computational Techniques	4	CE G521	Topics in Structural Engineering	5
CE G522	Pavement Design, Maintenance and Management	5	CE G532	Advanced Soil Mechanics	4
CE G524	Urban Mass Transit Planning , Operations and Management	4	CE G533	Advance Composite Materials for Structures	4
CE G526	Systems Approach to Water Resources Modelling	4	CE G611	Computer Aided Analysis and Design	5
CE G527	Construction Management	4	CE G612	Advanced Steel Structures	4
CE G528	Selection of Construction Equipment and Modelling	4	CE G613	Advanced Concrete structures	4
CE G529	Construction Project Control Systems	4	CE G614	Prestressed Concrete Structures	4
CE G530	Design of Construction Operation	4	CE G616	Bridge Engineering	4
CE G531	Environmental Conservation	4	CE G618	Design of multi-story structures	4
CE G533	Advance Composite Materials for Structures	4	CE G620	Advanced Foundation Engineering	4
CE G542	Water Resources and Management	4	CE G621	Fluid Dynamics	5
CE G610	Computer Aided Analysis & Design in Civil Engineering	5	CE G622	Soil-Structure-Interaction	4
CE G616	Bridge Engineering	4	CE G623	Ground Improvement techniques	4
CE G618	Design of Multi-Storey Structures	4	CE G631	Selected Topics in Soil Mechanics and Geotechnical Engineering	4
CE G619	Finite Element Analysis	5	CE G641	Theory of Elasticity & Plasticity	5
CHE G518	Environmental Management Systems	3	Civil with Specialization in Transportation Engineering		
EA C442	Remote Sensing and Image Processing	3	Named Courses		
Civil with Specialization in Structural Engineering			CE G518	Pavement Analysis and Design	4
Named Courses			CE G523	Transportation Systems Planning and Management	4
CE G513	Advance Computational Techniques	4	CE G524	Urban Mass Transit Planning, Operations & Management	4
CE G610	Computer Aided Analysis and Design in Civil Engineering	5	CE G532	Advanced Soil Mechanics	4
CE G615	Earthquake Engineering	4	CE G534	Pavement Material Characterization	4
CE G617	Advanced Structural Analysis	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	EEE C414	Telecom Switching Systems & Networks	3 0 3
Electives (any two)			EEE G510	RF Microelectronics	5
Pool 1 for electives 1			EEE G512	Embedded System Design	4
CE G516	Multi Criteria Analysis in Engineering	4	EEE G521	Optoelectronic Devices, Circuits and Systems	5
CE G543	Traffic Flow Theory	4	EEE G531	Testable Design and Fault Tolerant Computing	5
CE G544	Environmental Impact Assessment	4	EEE G582	Telecom network Management	5
CE G545	Airport Planning and Design	4	EEE G611	Computer Aided Analysis and Design	5
CE G616	Bridge Engineering	4	EEE G613	Advanced Digital Signal Processing	5
CE G619	Finite Element Analysis	5	EEE G626	Hardware Software Code-sign	4
Pool 2 for electives 2			MEL G621	VLSI Design	5
CE G520	Infrastructure Planning and Management	4	MEL G632	Analog IC Design	5
CE G528	Selection of Construction Equipment and Modeling	4	Computer Science		
CE G546	Highway Construction Practices	4	Named Courses		
CE G547	Pavement Failures, Evaluation and Rehabilitation	4	CS G513	Network Security	4
CE G548	Pavement Management Systems	4	CS G514	Object Oriented Analysis and Design	4
CE G549	Rural Road Technology	4	CS G551	Advanced Compilation Techniques	5
Communication Engineering			CS G553	Reconfigurable Computing	5
Named Courses			CS G562	Advanced Architecture and Performance Evaluation	5
EEE C415	Digital Signal Processing	3 0 3	CS G623	Advanced Operating System	5
EEE C472	Satellite Communication	3 0 3	EEE G512	Embedded System Design	4
EEE G581	RF and Microwave Engg.	5	Elective Courses (any two)		
EEE G591	Optical Communication	5	BITS C463	Cryptography	3 0 3
EEE G592	Mobile and Personal Communication	5	BITS C464	Machine Learning	3 0 3
EEE G612	Coding Theory and Practice	5	BITS G553	Real Time Systems	5
EEE G622	Advanced Digital Communication	5	BITS G554	Data Compression	3 2 5
Electives (any two)			BITS G624	Computer Based Simulation & Modelling	5
BITS G553	Real Time Systems	5	CS C415	Data Mining	3 0 3
BITS G554	Data Compression	3 2 5	CS C422	Parallel Computing	3 0 3
CS G553	Reconfigurable Computing	5	CS C424	Software for Embedded Systems	3 0 3
CS G555	System Specifications and Modeling	4	CS C441	Selected Topics from Computer Science	3
EA C415	Introduction to MEMS	4			
EA C451	Internetworking Technology	3 0 3			
EA C473	Multimedia Computing	3 0 3			

CS C442	Advanced Algorithms & Complexity	3 0 3	EEE G627	Networked Embedded Applications	4
CS C446	Data Storages Technologies and Networks	3 0 3	IS C462	Network Programming	3 0 3
CS C451	Combinatorial Mathematics	3 0 3	MATH G541	Advanced Methods in Discrete Mathematics	5
CS C453	Discrete Mathematical Structures	3 0 3	MATH C412	Concepts of Geometry	3 0 3
CS C461	Computer Networks	3 0 3	MATH C431	Distribution Theory	3 0 3
CS C471	Computer Graphics	3 0 3	MATH G531	Number Theory	5
CS G512	Introduction of Authoring Systems	4	SS G515	Data Warehousing	5
CS G515	Queueing System Theory	5	Design Engineering		
CS G531	Testable Design & Fault Tolerant Computing	5	Named Courses		
CS G541	Pervasive Computing	4	DE G611	Dynamics & Vibration	5
CS G554	Distributed Data Systems	3 2 5	DE G531	Product Design	5
CS G611	Distributed Processing Systems	4	DE G631	Materials Technology & Testing	5
CS G612	Fault Tolerant System Design	5	ME G511	Mechanisms and Robotics	5
CS G631	Devices, Data Communication and Control	5	ME G512	Finite Element Methods	4
CS G632	Application Driven System Design	4	ME G521	Mechanical System Design	5
CS G641	Microprocessor Based Systems Design	5	ME G611	Computer Aided Analysis and Design	5
CS G642	Recent Advances in Computing	4	Electives (any two)		
CS G651	Symbolic Computing & Computer Algebra	4	DE G513	Tribology	5
CS G652	Digital Communications and Message Switching	5	DE G514	Fracture Mechanics	5
CS G653	Software Architecture	5	DE G521	Instrumentation and Applied Electronics	5
CS G671	Advanced Computer Graphics	5	DE G522	Design Projects	5
EA C451	Internetworking Technologies	3 0 3	EA C415	Introduction to MEMS	4
EA C473	Multimedia Computing	3 0 3	MSE G511	Mechatronics	5
EEE G582	Telecom Network Management	5	MSE G531	Concurrent Engineering	5
EEE G612	Coding Theory & Practice	5	MST G511	Nondestructive Testing Techniques	3 2 5
EEE G626	Hardware Software Code-	4	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	MEL G626	VLSI Test and Testability	5
EEE G552	Solid State Drives	5	Manufacturing Systems Engineering		
EEE G545	Control and Instrumentation for PE Systems	3	Named Courses		
EEE G546	Systems Simulation Lab	4	EA C412	Flexible Manufacturing Systems	3 2 4
Electives (any two)			ME C443	Quality Control, Assurance & Reliability	3 0 3
EEE G553	Utility Applications of Power Electronics.	3	ME G511	Mechanisms and Robotics	5
EEE G554	Soft Switching Converter Technologies	3	MSE G511	Mechatronics	5
EEE G555	Transformer and Motor Design	3	MSE G512	Manufacturing Planning and Control	4
EEE G556	DSP Based Implementation of Drives	3	MSE G521	World-class Manufacturing	5
EEE G557	Drives for Electric Traction	3	MSE G531	Concurrent Engineering	5
Embedded Systems			Electives (any two)		
Named Courses			BITS C471	Management Information Systems	3 0 3
BITS G553	Real Time Systems	5	DE G522	Design Projects	5
CS C424	Software For Embedded Systems	3 0 3	DE G531	Product Design	5
CS G555	System Specification & Modelling	3 3 4	DE G631	Materials Technology & Testing	5
EEE C415	Digital Signal Processing	3 0 3	EA C415	Introduction to MEMS	4
EEE G512	Embedded System Design	3 1 4	ITEB G621	Supply Chain Management	4
EEE G626	Hardware Software Co-design	4	ME C412	Production Planning & Control	3 0 3
MEL G642	VLSI Architectures	2 2 4	ME C432	Computer Aided Manufacturing	3 0 3
Electives (any two)			ME C472	Precision Engineering	3 0 3
BITS G554	Data compression	3 2 5	ME G532	Machine Tool Engineering	5
CS G541	Pervasive Computing	4	ME G611	Computer Aided Analysis and Design	5
CS G553	Reconfigurable Computing	5	MGTS C481	Industrial Marketing	3 0 3
CS G562	Advanced Architecture and Performance Evaluation	5	MM G522	Total Quality Management	4
CSG612	Fault tolerant System Design	2 3 5	MSE G513	Maintenance Engineering	4
EEE G592	Mobile and Personal Communication	3 2 5	MSE G514	Leadership and Managing Change	4
EEE G613	Advanced Digital Signal Processing	5	Mechanical Engineering		
EEEG621			Named Courses		
EEEG621	Advanced Electronic Circuits	3 2 5	ME C443	Quality Control, Assurance & Reliability	3 0 3
EEE G625	Safety Critical Embedded System Design	4	ME G511	Mechanisms and Robotics	5
EEE G627	Networked Embedded Applications	4	ME G512	Finite Element Methods	5
INSTR G611	Advanced Control Systems	3 2 5	ME G532	Machine Tool Engineering	5
			ME G611	Computer Aided Analysis and Design	5

ME G631	Heat Transfer	5	EA C415	Introduction to MEMS	4
ME G641	Theory of Elasticity & Plasticity	5	EEE C415	Digital Signal Processing	3 0 3
Electives (any two)					
DE G513	Tribology	5	EEE G510	RF Microelectronics	5
DE G514	Fracutre mechanics	5	EEE G512	Embedded System Design	4
DE G522	Digital Projects	5	EEE G592	Mobile and Personal Communication	5
EA C415	Introduction to MEMS	4	EEE G626	Hardware Software Code-sign	4
ITEB G621	Supply Chain Management	4	MEL G512	Optoelectronic Devices, Circuits and Systems	5
ME C472	Precision Engineering	3 0 3	MEL G531	Testable Design & Fault Tolerant Computing	5
ME G513	Heating and Cooling of Buildings	5	MEL G612	Integrated Electronic System Design	4
ME G514	Turbomachinery	5	MEL G622	Introduction to Artificial Neural Networks	4
ME G515	Computational Fluid Dynamics	5	MEL G623	Advanced VLSI Design	5
ME G516	Energy Systems Engineering	5	MEL G624	Advanced VLSI Architectures	5
ME G521	Mechanical System Design	5	MEL G625	Advanced Analog and Mixed Signal Design	5
ME G621	Fluid Dynamics	5	MEL G626	VLSI Test and Testability	5
MM G522	Total Quality Management	5	Pharmacy		
MSE G513	Maintenance Engineering	4	Named Courses		
MST G511	Nondestructive Techniques	3 2 5	PHA G532	Quality Assurance & Regulatory Affairs	5
MST G522	Advanced Composites	5	PHA G611	Advanced Pharmacology	5
MST G531	Experimental Stress Analysis Techniques	5	PHA G612	Pharmacokinetics & Clinical Pharmacy	5
Microelectronics					
Named Courses					
MEL G611	IC Fabrication Technology	5	PHA G613	Pharmaceutical Biotechnology	5
MEL G621	VLSI Design	5	PHA G614	Clinical Pharmacy & Therapeutics	5
MEL G631	Physics and Modelling of Microelectronic Devices	5	PHA G621	Advanced Medicinal Chemistry	5
MEL G632	Analog IC Design	5	PHA G632	Dosage Form Design	5
MEL G641	CAD for IC Design	5	Electives Courses (any two)		
MEL G642	VLSI Architectures	4	BIO C414	Genetic Engineering	1 6 3
Electives (any three)					
BITS G554	Data Compression	3 2 5	BIO C417	Biomolecular Modeling	3 0 3
CS G553	Reconfigurable Computing	5	PHA G511	Fermentation and Biotechnology	5
CS G555	System Specifications and Modeling	4	PHA G512	Chemistry of Natural Drugs	4
CS G562	Advanced Architecture and Performance Evaluation	5	PHA G521	Molecular Biology and Immunology	4
CS G612	Fault Tolerant System Design	5	PHA G522	Chemistry of Macromolecules	4

For Engineering & Technology Management

MBA C414	Technology Management	3 0 3
MBA C425	R & D Management	3 0 3
MBA C429	Recent Advances in ETM	4
MBA C451	Internetworking Technologies	3 0 3
MBA C454	Project Appraisal	3 0 3
MBA C482	Creating and Reading Entrepreneurial Organization	3 0 3
MBA C483	Marketing Research	3 0 3
MBA C512	Manufacturing Strategy	4
MBA C522	Total Quality Management	4
MBA C523	Project Management	4
MBA C552	Total Productive Maintenance	4
MBA G622	Software Project Management	4

For IT Enabled Services Management

MBA C426	Database Management Systems	4
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 C451	Internetworking Technologies	3 0 3
MBA C454	Project Appraisal	3 0 3
MBA C482	Creating and Reading Entrepreneurial Organization	3 0 3
MBA C481	Expert Systems	4
MBA C488	Services Management System	3 0 3
MBA G622	Software Project Management	4

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
CHEM G521	Environmental Chemistry	5
CHEM G531	Recent Advances in Chemistry	5

CHEM G541	Chemical Applications of Group Theory	5
CHEM G551	Advanced Organic Chemistry	5
CHEM G552	Advanced Inorganic Chemistry	5
ECON G511	Dynamic Modelling and Control of National Economies	5
ECON G521	Modern Cost Engineering	5
ECON G531	Theory of Macroeconomic Policy	5
ECON G541	Economic Systems Analysis	5
ENGL G511	Growth of the English Language	5
ENGL G512	Language and S & T	5
ENGL G513	Social Impact of S & T	5
ENGL G521	Principles of Language Teaching	5
ENGL G522	Aesthetics and Technology	5
ENGL G531	Applied Linguistics	5
ENGL G541	Interpretation of Literature	5
ENGL G551	Information Technology Lab. I	5
ENGL G561	Information Technology Lab.II	5
ENGL G571	Applied Communication I	5
ENGL G581	Applied Communication II	5
ENGL G591	Project Formulation and Preparation	5
ENGL G611	Twentieth Century English Literature	5
ET G511	Science and Technology Dynamics	5
ET G521	Hi-Tech Management	5
ET G531	Systems Engineering	5
ET G541	Overview of Technology	5
HUM G511	Introduction to Health System	3 0 3
MATH G511	Design and Analysis of Algorithms	5
MATH G512	Selected Topics in Advanced Mathematics for Engineering Situations	5
MATH G521	Applied Functional Analysis	5
MATH G531	Number Theory	5
MATH G541	Advanced Methods in Discrete Mathematics	5
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
MGTS G521	Business Policy - Structure and Organization	5
MGTS G531	Recent Advances in Organization Behaviour Theory	5
MGTS G541	Management Information and Decision Support Systems	5
MGTS G551	Frontiers in Financial Management	5
MGTS G561	Institutional Finance & Project Appraisal	5

MPH	C431	Accounting & Finance	4	COMMON COURSES FOR HIGHER DEGREES				
MPH	G510	Biostatistics & Computers in Public Health	5		BITS	G529	Research Project I	6
MPH	G512	Environmental & Occupational Health	4		BITS	G539	Research Project II	6
MPH	G513	Public Health & Diseases	4		BITS	G619	Professional Practice	4
MPH	G515	Communication in Health Care	4		BITS	G620	Professional Practice I	3
MPH	G521	Health Care Management	4		BITS	G621	Professional Practice II	3
MPH	G522	Preventive Nutrition & Health Promotion	4		BITS	G629T	Dissertation	25 (Max.)
MPH	G523	Epidemic & Disaster Management	4		BITS	G639	Practice School	20
MPH	G531	Health Economics & Financial Management	4		BITS	G649	Reading Course	5
MPH	G535	Family & Community Health Measures	3		BITS	G659	Technical Communication	4
MPH	G537	Law & Ethics in Public Health	3		NOTE : Courses with 4 level numbers given above are advanced level electives from the offering of the Integrated First Degree programmes.			
MPH	G538	Telemedicine	3		COMMON POOL OF ELECTIVES FOR HIGHER DEGREES			
MPH	G539	Inter-sectoral co-ordination in Health Services	3		BITS	G513	Study in Advanced Topics	5
MPH	G540	Role of Voluntary bodies/ NGO's in Public Health	3		BITS	G649	Reading Course	5
MPH	G661	Research Methodology I	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.			
MPH	G665	Hospital Operations Management	3					
MPH	G681	Strategic Management	3					
MPH	G613	Health Systems and Society	2					
MPH	G692	Epidemiology	2					
PHY	G511	Theoretical Physics	5					
PHY	G521	Nuclear and Particle Physics	5					
PHY	G531	Selected Topics in Solid State Physics	5					
PHY	G541	Physics of Semiconductor Devices	5					
SKILL	G611	Computer Operation and Software Development I	5					
SKILL	G612	Computer Operation and Software Development II	5					
SKILL	G621	Computer Maintenance I	5					
SKILL	G622	Computer Maintenance II	5					
SKILL	G631	Professional Communication I	5					
SKILL	G632	Professional Communication II	5					
SKILL	G641	Modern Experimental Methods I	5					
SKILL	G642	Modern Experimental Methods II	5					
SKILL	G651	Techniques in Development Management I	5					
SKILL	G652	Techniques in Development Management II	5					
SKILL	G661	Research Methodology I	5					
SKILL	G662	Research Methodology II	5					

All courses given above are unstructured. Actual structuring will be done from time to time.

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.

Off-Campus Ph.D.

This programme enables experienced personnel and professionals in various disciplines 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 possess 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 E541	Chemical and Life Science I	4
BITS E512	Computer Applications II	4	BITS E542	Chemical and Life Science II	4
BITS E521	Technical Communication I	4	BITS E543	Instrumentation Engineering I	4
BITS E522	Technical Communication II	4	BITS E544	Instrumentation Engineering II	4
BITS E531	Social, Behavioral & Economic Sciences I	4	BITS E545	Project and Consultancy I	4
BITS E532	Social Behavioral & Economic Sciences II	4	BITS E546	Project and Consultancy II	4
BITS E533	Modern Experimental Techniques-I	4	BITS E547	Public Administration I	4
BITS E534	Modern Experimental Techniques II	4	BITS E548	Public Administration II	4
BITS E535	Management Methods & Techniques I	4	BITS E551	Physical and Mathematical Sciences I	4
BITS E536	Management Methods & Techniques II	4	BITS E552	Physical and Mathematical Sciences II	4
BITS E537	Systems Sciences and Engineering I	4	BITS E561	Use of English for Professional Purposes I	4
BITS E538	Systems Science and Engineering II	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.

