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BTEUP CSE Complete Syllabus 2026-27

All Years, All Semesters — Complete, in One PDF

Diploma in Computer Science & Engineering • NEP-2020 • Approved 16.07.2026

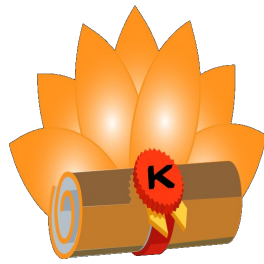
What is inside: the complete BTEUP Diploma in Computer Science & Engineering syllabus for 2026-27, all years in one file — the full 1st-year common curriculum (11 subjects, same for 41 engineering branches, with the verified examination scheme: 1st semester 18 credits, 900 marks; 2nd semester 22 credits, 1050 marks), the full 3rd semester (800 marks, 21 credits), the 4th-semester subject names, the full 5th semester (550 marks, 20 credits, with electives), and the full 6th semester (650 marks, 20 credits, dominated by the 400-mark In House Project). Each subject keeps its own pages, tables and reference books. **Please note:** for the 1st year, the official curriculum gives no paper codes — subjects are numbered 1.1–1.6 and 2.1–2.7 only. For the 4th semester, only subject names are verified so far.

Contents

Subject	Page
1st Year — First Year (Common Curriculum, All Branches)	
Mathematics	4
Physics	8
Chemistry	12
English Communication	16
Engineering Graphics	20
Workshop Practice	24

IT Systems	28
Electrical & Electronics Fundamentals	32
Engineering Mechanics	36
Environmental Science	40
Sports & Yoga	44
2nd Year — 3rd & 4th Semester	
Operating Systems (Theory + Lab)	48
Database Management System (Theory + Lab)	52
Computer Network	55
Web Technologies	58
Computer Programming Using C	62
Summer Internship-I & Student Centred Activities	66
4th Semester — Subjects (names only, details to follow)	68
3rd Year — 5th & 6th Semester	
Object Oriented Programming Using Java	69
Fundamentals of Internet of Things	73
Mobile App Development (Elective-2, Option 1)	76
Multimedia Technologies (Elective-2, Option 2)	79
Information Security (Elective-3, Option 1)	82
Advance Computer Networks (Elective-3, Option 2)	85
Open Elective-2 & Advance Skill Development	88
Summer Internship-II, Indian Constitution & SCA	90
Program Elective-4 — Artificial Intelligence / Data Science & Machine Learning (6.1)	92
Entrepreneurship and Start-ups (6.2)	97
In House Project (6.3)	101
Open Elective-3 — Disaster Management / Renewable Energy Technologies (6.4)	104





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Mathematics — First Year

BTEUP Diploma • 1st Semester (First Year — Common Curriculum) • Session 2026–27
Common Curriculum • 1st Semester • All 41 Engineering Branches

About this document: The first year of a BTEUP diploma runs on one common curriculum for 41 engineering branches, so this subject is the same whether you are in Computer Science, Mechanical, Civil or Electrical. The examination scheme below is from the official 1st-year curriculum (folder2627, NEP-2020), corrected and approved by the Board of Technical Education, U.P. Lucknow in the C.D.C. meeting held on 16.07.2026.

What This Subject Aims To Do

To build the mathematical foundation every engineer needs — the algebra, calculus and matrices that later subjects (C programming logic, networks, data structures) all stand on.

Unit-Wise Complete Topic List

Algebra & Trigonometry

Topics: Algebraic expressions and equations; trigonometric ratios, identities and heights and distances.

In simple words: The everyday maths of engineering: solving equations and working with angles and triangles.

Calculus

Topics: Limits, differentiation and its applications; integration and its applications; definite integrals.

In simple words: How things change and accumulate — the maths behind rates, slopes, areas and volumes.

Matrices & Determinants

Topics: Types of matrices; operations on matrices; determinants; solving systems of linear equations.

In simple words: Organising numbers in tables and solving several equations at once — the same idea behind computer graphics and data handling.

Differential Equations

Topics: First-order differential equations and their simple applications.

In simple words: Equations that describe how things change over time — used everywhere from circuits to mechanics.

Examination Scheme — 1st & 2nd Semester (Official, Verified 2026-27)

1st Semester — 18 Credits, 900 Marks

Sr. No.	Subject	L-T-P	Credits	Internal	External	Total
1.1	Mathematics-I	2-1-0	3	Th 40	Th 60	100
1.2	Applied Physics-I	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.3	Applied Chemistry OR Introduction to IT and AI	3-0-2 / 2-0-4	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.4	Communication Skills in English OR Fundamentals of Electrical & Electronics Engineering	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200

1.5	Engineering Graphics OR Engineering Workshop Practice	0-0- 4	2	Graphics: Pr 40 / Workshop: Pr 60	Graphics: Th 60 / Workshop: Pr 40	100
1.6	Sports & Yoga	0-0- 2	1	Pr 50	—	50
—	Student Centred Activities (SCA)	0-0- 10	—	Pr 50	—	50
1st Semester Total			18	—	—	900

2nd Semester — 22 Credits, 1050 Marks

Sr. No.	Subject	L-T- P	Credits	Internal	External	Total
2.1	Mathematics-II	3-1- 0	4	Th 40	Th 60	100
2.2	Applied Physics-II	3-0- 2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.3	Introduction to IT and AI OR Applied Chemistry	2-0- 4 / 3-0- 2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.4	Fundamentals of Electrical & Electronics Engineering OR Communication Skills in English	3-0- 2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.5	Engineering Mechanics	2-1- 2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.6	Engineering Workshop Practice OR Engineering Graphics	0-0- 4	2	Workshop: Pr 60 / Graphics: Pr 40	Workshop: Pr 40 / Graphics: Th 60	100
2.7	(Q) Environmental Sciences	3-0- 0	— (Audit)	—	Th 60*	—
—	Student Centred Activities (SCA)	0-0- 4	—	Pr 50	—	50
2nd Semester Total			22	—	—	1050

About the OR choices: at Sr. No. 1.3, 1.4 and 1.5 the institute chooses which alternative runs in the 1st semester; the other alternative then runs in the 2nd semester (1.3 ↔ 2.3, 1.4 ↔ 2.4, 1.5 ↔ 2.6). An alternative once selected in the 1st semester is not selected again in the 2nd semester.

No paper codes: the official 1st-year curriculum gives no paper codes — subjects are numbered 1.1–1.6 in the 1st semester and 2.1–2.7 in the 2nd semester only.

Qualifying subject: Environmental Sciences (2.7, Q) is an audit subject — you must appear and pass, but its 60 external marks are not counted for percentage or division.

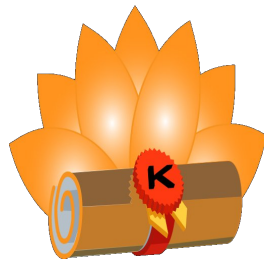
Each period is 60 minutes; each session is 16 weeks, with at least 14 effective teaching weeks. A 4-week summer internship (Internship-I) is organised after the 2nd-semester examination and is evaluated in the 3rd semester.

How This Helps You Later

If your maths is weak, building logic in C programming becomes difficult. Strong first-year maths makes 2nd-year subjects noticeably easier.

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Source: BTEUP 1st Year common curriculum (folder2627), corrected and approved in the C.D.C. meeting held on 16.07.2026 — scheme and subject areas verified. Topic lists follow the official syllabus; short explanations are the author's own plain-English summaries, not syllabus text. Please confirm with your own polytechnic for any local changes.



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Physics — First Year

BTEUP Diploma • 1st Semester (First Year — Common Curriculum) • Session 2026–27
Common Curriculum • 1st Semester • All 41 Engineering Branches

About this document: The first year of a BTEUP diploma runs on one common curriculum for 41 engineering branches, so this subject is the same whether you are in Computer Science, Mechanical, Civil or Electrical. The examination scheme below is from the official 1st-year curriculum (folder2627, NEP-2020), corrected and approved by the Board of Technical Education, U.P. Lucknow in the C.D.C. meeting held on 16.07.2026.

What This Subject Aims To Do

To build a working understanding of the physical world — motion, force, energy, light, sound and electricity — through concepts and simple experiments.

Unit-Wise Complete Topic List

Mechanics

Topics: Laws of motion; force, work, energy and power; friction; circular motion.

In simple words: Why things move the way they do — the foundation of machines and structures.

Electricity & Magnetism

Topics: Electric charge, current and voltage; Ohm's law; magnetic effects of current.

In simple words: The physics behind every circuit you will meet in electronics and networks.

Optics & Waves

Topics: Reflection and refraction; lenses; wave motion and sound.

In simple words: How light and sound behave — used in instruments, communication and displays.

Modern Physics

Topics: Atomic structure; semiconductors in brief; lasers and their uses.

In simple words: A first look at the physics inside chips and modern devices.

Examination Scheme — 1st & 2nd Semester (Official, Verified 2026-27)

1st Semester — 18 Credits, 900 Marks

Sr. No.	Subject	L-T-P	Credits	Internal	External	Total
1.1	Mathematics-I	2-1-0	3	Th 40	Th 60	100
1.2	Applied Physics-I	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.3	Applied Chemistry OR Introduction to IT and AI	3-0-2 / 2-0-4	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.4	Communication Skills in English OR Fundamentals of Electrical & Electronics Engineering	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.5	Engineering Graphics OR Engineering Workshop Practice	0-0-4	2	Graphics: Pr 40 / Workshop: Pr 60	Graphics: Th 60 / Workshop: Pr 40	100
1.6	Sports & Yoga	0-0-2	1	Pr 50	—	50
—	Student Centred Activities (SCA)	0-0-10	—	Pr 50	—	50

1st Semester Total	18	—	—	900
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2nd Semester — 22 Credits, 1050 Marks

Sr. No.	Subject	L-T-P	Credits	Internal	External	Total
2.1	Mathematics-II	3-1-0	4	Th 40	Th 60	100
2.2	Applied Physics-II	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.3	Introduction to IT and AI OR Applied Chemistry	2-0-4 / 3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.4	Fundamentals of Electrical & Electronics Engineering OR Communication Skills in English	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.5	Engineering Mechanics	2-1-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.6	Engineering Workshop Practice OR Engineering Graphics	0-0-4	2	Workshop: Pr 60 / Graphics: Pr 40	Workshop: Pr 40 / Graphics: Th 60	100
2.7	(Q) Environmental Sciences	3-0-0	— (Audit)	—	Th 60*	—
—	Student Centred Activities (SCA)	0-0-4	—	Pr 50	—	50
2nd Semester Total			22	—	—	1050

About the OR choices: at Sr. No. 1.3, 1.4 and 1.5 the institute chooses which alternative runs in the 1st semester; the other alternative then runs in the 2nd semester (1.3 ↔ 2.3, 1.4 ↔ 2.4, 1.5 ↔ 2.6). An alternative once selected in the 1st semester is not selected again in the 2nd semester.

No paper codes: the official 1st-year curriculum gives no paper codes — subjects are numbered 1.1–1.6 in the 1st semester and 2.1–2.7 in the 2nd semester only.

Qualifying subject: Environmental Sciences (2.7, Q) is an audit subject — you must appear and pass, but its 60 external marks are not counted for percentage or division.

Each period is 60 minutes; each session is 16 weeks, with at least 14 effective teaching weeks. A 4-week summer internship (Internship-I) is organised after the 2nd-semester examination and is evaluated in the 3rd semester.

How This Helps You Later

Physics and electronics form the base of Computer Networks and IoT. Weak physics in the first year makes networks harder in the 2nd year.

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Chemistry — First Year

BTEUP Diploma • 1st Semester (First Year — Common Curriculum) • Session 2026–27
Common Curriculum • 1st Semester • All 41 Engineering Branches

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What This Subject Aims To Do

To give a practical understanding of the chemistry that engineers meet — materials, water, fuels and corrosion — and safe laboratory practice.

Unit-Wise Complete Topic List

Atomic Structure & Bonding

Topics: Atoms, molecules and ions; chemical bonds; the periodic table in brief.

In simple words: What materials are made of and why they behave the way they do.

Water Technology

Topics: Hardness of water; water treatment methods; boiler feed water.

In simple words: Why water must be treated before it is used in boilers and industry.

Fuels & Combustion

Topics: Types of fuels; calorific value; combustion and its control.

In simple words: How fuels release energy and how that energy is used efficiently.

Corrosion & Its Prevention

Topics: What corrosion is; types of corrosion; methods of prevention.

In simple words: Why metals rust and wear out, and how engineers protect them.

Examination Scheme – 1st & 2nd Semester (Official, Verified 2026-27)

1st Semester — 18 Credits, 900 Marks

Sr. No.	Subject	L-T-P	Credits	Internal	External	Total
1.1	Mathematics-I	2-1-0	3	Th 40	Th 60	100
1.2	Applied Physics-I	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.3	Applied Chemistry OR Introduction to IT and AI	3-0-2 / 2-0-4	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.4	Communication Skills in English OR Fundamentals of Electrical & Electronics Engineering	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.5	Engineering Graphics OR Engineering Workshop Practice	0-0-4	2	Graphics: Pr 40 / Workshop: Pr 60	Graphics: Th 60 / Workshop: Pr 40	100
1.6	Sports & Yoga	0-0-2	1	Pr 50	—	50
—	Student Centred Activities (SCA)	0-0-10	—	Pr 50	—	50
1st Semester Total			18	—	—	900

2nd Semester — 22 Credits, 1050 Marks

Sr. No.	Subject	L-T-P	Credits	Internal	External	Total
2.1	Mathematics-II	3-1-0	4	Th 40	Th 60	100
2.2	Applied Physics-II	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.3	Introduction to IT and AI OR Applied Chemistry	2-0-4 / 3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.4	Fundamentals of Electrical & Electronics Engineering OR Communication Skills in English	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.5	Engineering Mechanics	2-1-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.6	Engineering Workshop Practice OR Engineering Graphics	0-0-4	2	Workshop: Pr 60 / Graphics: Pr 40	Workshop: Pr 40 / Graphics: Th 60	100
2.7	(Q) Environmental Sciences	3-0-0	— (Audit)	—	Th 60*	—
—	Student Centred Activities (SCA)	0-0-4	—	Pr 50	—	50
2nd Semester Total			22	—	—	1050

About the OR choices: at Sr. No. 1.3, 1.4 and 1.5 the institute chooses which alternative runs in the 1st semester; the other alternative then runs in the 2nd semester (1.3 ↔ 2.3, 1.4 ↔ 2.4, 1.5 ↔ 2.6). An alternative once selected in the 1st semester is not selected again in the 2nd semester.

No paper codes: the official 1st-year curriculum gives no paper codes — subjects are numbered 1.1–1.6 in the 1st semester and 2.1–2.7 in the 2nd semester only.

Qualifying subject: Environmental Sciences (2.7, Q) is an audit subject — you must appear and pass, but its 60 external marks are not counted for percentage or division.

Each period is 60 minutes; each session is 16 weeks, with at least 14 effective teaching weeks. A 4-week summer internship (Internship-I) is organised after the 2nd-semester examination and is evaluated in the 3rd semester.

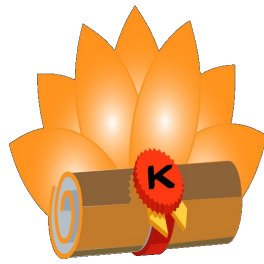
How This Helps You Later

Chemistry teaches you how materials behave — useful whenever you work with hardware, batteries and electronic components.

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English Communication — First Year

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Common Curriculum • 1st Semester • All 41 Engineering Branches

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What This Subject Aims To Do

To build the English communication skills a diploma engineer needs — reading technical material, writing clearly, and speaking confidently in interviews and at work.

Unit-Wise Complete Topic List

Reading & Comprehension

Topics: Reading technical passages; understanding instructions and manuals; vocabulary building.

In simple words: Reading a manual or a question paper and understanding exactly what it asks.

Writing Skills

Topics: Letters, emails, reports and notices; paragraph and essay writing; grammar in use.

In simple words: Writing clearly and correctly — the skill behind every report, email and job application.

Speaking & Listening

Topics: Introducing yourself; group discussion; presentation skills; listening comprehension.

In simple words: Speaking with confidence in class, in viva and in placement interviews.

Workplace Communication

Topics: Resume writing; interview skills; telephone and email etiquette.

In simple words: The communication that gets you placed and keeps you professional at work.

Examination Scheme — 1st & 2nd Semester (Official, Verified 2026-27)

1st Semester — 18 Credits, 900 Marks

Sr. No.	Subject	L-T-P	Credits	Internal	External	Total
1.1	Mathematics-I	2-1-0	3	Th 40	Th 60	100
1.2	Applied Physics-I	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.3	Applied Chemistry OR Introduction to IT and AI	3-0-2 / 2-0-4	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.4	Communication Skills in English OR Fundamentals of Electrical & Electronics Engineering	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200

1.5	Engineering Graphics OR Engineering Workshop Practice	0-0- 4	2	Graphics: Pr 40 / Workshop: Pr 60	Graphics: Th 60 / Workshop: Pr 40	100
1.6	Sports & Yoga	0-0- 2	1	Pr 50	—	50
—	Student Centred Activities (SCA)	0-0- 10	—	Pr 50	—	50
1st Semester Total			18	—	—	900

2nd Semester — 22 Credits, 1050 Marks

Sr. No.	Subject	L-T- P	Credits	Internal	External	Total
2.1	Mathematics-II	3-1- 0	4	Th 40	Th 60	100
2.2	Applied Physics-II	3-0- 2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.3	Introduction to IT and AI OR Applied Chemistry	2-0- 4 / 3-0- 2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.4	Fundamentals of Electrical & Electronics Engineering OR Communication Skills in English	3-0- 2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.5	Engineering Mechanics	2-1- 2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.6	Engineering Workshop Practice OR Engineering Graphics	0-0- 4	2	Workshop: Pr 60 / Graphics: Pr 40	Workshop: Pr 40 / Graphics: Th 60	100
2.7	(Q) Environmental Sciences	3-0- 0	— (Audit)	—	Th 60*	—
—	Student Centred Activities (SCA)	0-0- 4	—	Pr 50	—	50
2nd Semester Total			22	—	—	1050

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No paper codes: the official 1st-year curriculum gives no paper codes — subjects are numbered 1.1–1.6 in the 1st semester and 2.1–2.7 in the 2nd semester only.

Qualifying subject: Environmental Sciences (2.7, Q) is an audit subject — you must appear and pass, but its 60 external marks are not counted for percentage or division.

Each period is 60 minutes; each session is 16 weeks, with at least 14 effective teaching weeks. A 4-week summer internship (Internship-I) is organised after the 2nd-semester examination and is evaluated in the 3rd semester.

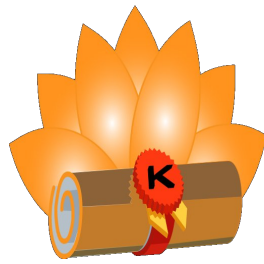
How This Helps You Later

Communication skill decides how far technical skill takes you — in viva, in interviews and in every job after the diploma.

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Engineering Graphics — First Year

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Common Curriculum • 1st Semester • All 41 Engineering Branches

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What This Subject Aims To Do

To teach the language engineers draw in — lines, projections and sections — so you can read a drawing and make one, by hand and on computer.

Unit-Wise Complete Topic List

Drawing Basics

Topics: Drawing instruments; lines and lettering; dimensioning; scales.

In simple words: The alphabet of engineering drawing: line types, letters and measurements.

Projections

Topics: Orthographic projections; first-angle and third-angle projection; isometric views.

In simple words: How a 3D object is shown correctly on a flat sheet of paper.

Sections & Development

Topics: Sectional views; development of surfaces.

In simple words: Seeing inside an object on paper, and unfolding a 3D shape into a flat pattern.

Computer-Aided Drawing

Topics: Introduction to CAD tools for engineering drawing.

In simple words: The same drawing work done on a computer — the skill used in every design office today.

Examination Scheme — 1st & 2nd Semester (Official, Verified 2026-27)

1st Semester — 18 Credits, 900 Marks

Sr. No.	Subject	L-T-P	Credits	Internal	External	Total
1.1	Mathematics-I	2-1-0	3	Th 40	Th 60	100
1.2	Applied Physics-I	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.3	Applied Chemistry OR Introduction to IT and AI	3-0-2 / 2-0-4	4	Th 40 + Pr 60	Th 60 + Pr 40	200
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1.6	Sports & Yoga	0-0-2	1	Pr 50	—	50
—	Student Centred Activities (SCA)	0-0-10	—	Pr 50	—	50

1st Semester Total	18	—	—	900
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2nd Semester — 22 Credits, 1050 Marks

Sr. No.	Subject	L-T-P	Credits	Internal	External	Total
2.1	Mathematics-II	3-1-0	4	Th 40	Th 60	100
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2.5	Engineering Mechanics	2-1-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.6	Engineering Workshop Practice OR Engineering Graphics	0-0-4	2	Workshop: Pr 60 / Graphics: Pr 40	Workshop: Pr 40 / Graphics: Th 60	100
2.7	(Q) Environmental Sciences	3-0-0	— (Audit)	—	Th 60*	—
—	Student Centred Activities (SCA)	0-0-4	—	Pr 50	—	50
2nd Semester Total			22	—	—	1050

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No paper codes: the official 1st-year curriculum gives no paper codes — subjects are numbered 1.1–1.6 in the 1st semester and 2.1–2.7 in the 2nd semester only.

Qualifying subject: Environmental Sciences (2.7, Q) is an audit subject — you must appear and pass, but its 60 external marks are not counted for percentage or division.

Each period is 60 minutes; each session is 16 weeks, with at least 14 effective teaching weeks. A 4-week summer internship (Internship-I) is organised after the 2nd-semester examination and is evaluated in the 3rd semester.

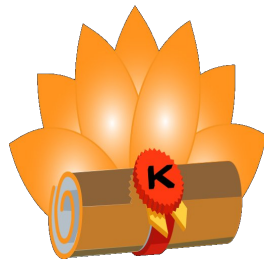
How This Helps You Later

Graphics trains your eye for shape and size — useful in every branch, and the base of design and modelling work.

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Source: BTEUP 1st Year common curriculum (folder2627), corrected and approved in the C.D.C. meeting held on 16.07.2026 — scheme and subject areas verified. Topic lists follow the official syllabus; short explanations are the author's own plain-English summaries, not syllabus text. Please confirm with your own polytechnic for any local changes.





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Workshop Practice — First Year

BTEUP Diploma • 1st Semester (First Year — Common Curriculum) • Session 2026–27
Common Curriculum • 1st Semester • All 41 Engineering Branches

About this document: The first year of a BTEUP diploma runs on one common curriculum for 41 engineering branches, so this subject is the same whether you are in Computer Science, Mechanical, Civil or Electrical. The examination scheme below is from the official 1st-year curriculum (folder2627, NEP-2020), corrected and approved by the Board of Technical Education, U.P. Lucknow in the C.D.C. meeting held on 16.07.2026.

What This Subject Aims To Do

To give hands-on workshop experience — measuring, cutting, fitting, joining and finishing — with real tools, safely and correctly.

Unit-Wise Complete Topic List

Fitting Shop

Topics: Measuring instruments; marking; filing; sawing; drilling; tapping.

In simple words: Making a metal piece to exact size by hand — the core workshop skill.

Carpentry & Joinery

Topics: Woodworking tools; joints; simple wooden jobs.

In simple words: Working with wood: cutting, shaping and joining it cleanly.

Welding & Sheet Metal

Topics: Arc and gas welding in brief; sheet-metal cutting, bending and joining.

In simple words: Joining metals and shaping thin sheets — used in fabrication everywhere.

Safety & Housekeeping

Topics: Workshop safety rules; personal protective equipment; tool care.

In simple words: The habits that keep you and others safe in any workshop or lab.

Examination Scheme — 1st & 2nd Semester (Official, Verified 2026-27)

1st Semester — 18 Credits, 900 Marks

Sr. No.	Subject	L-T-P	Credits	Internal	External	Total
1.1	Mathematics-I	2-1-0	3	Th 40	Th 60	100
1.2	Applied Physics-I	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.3	Applied Chemistry OR Introduction to IT and AI	3-0-2 / 2-0-4	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.4	Communication Skills in English OR Fundamentals of Electrical & Electronics Engineering	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.5	Engineering Graphics OR Engineering Workshop Practice	0-0-4	2	Graphics: Pr 40 / Workshop: Pr 60	Graphics: Th 60 / Workshop: Pr 40	100
1.6	Sports & Yoga	0-0-2	1	Pr 50	—	50
—	Student Centred Activities (SCA)	0-0-10	—	Pr 50	—	50

1st Semester Total	18	—	—	900
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2nd Semester — 22 Credits, 1050 Marks

Sr. No.	Subject	L-T-P	Credits	Internal	External	Total
2.1	Mathematics-II	3-1-0	4	Th 40	Th 60	100
2.2	Applied Physics-II	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.3	Introduction to IT and AI OR Applied Chemistry	2-0-4 / 3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.4	Fundamentals of Electrical & Electronics Engineering OR Communication Skills in English	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.5	Engineering Mechanics	2-1-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.6	Engineering Workshop Practice OR Engineering Graphics	0-0-4	2	Workshop: Pr 60 / Graphics: Pr 40	Workshop: Pr 40 / Graphics: Th 60	100
2.7	(Q) Environmental Sciences	3-0-0	— (Audit)	—	Th 60*	—
—	Student Centred Activities (SCA)	0-0-4	—	Pr 50	—	50
2nd Semester Total			22	—	—	1050

About the OR choices: at Sr. No. 1.3, 1.4 and 1.5 the institute chooses which alternative runs in the 1st semester; the other alternative then runs in the 2nd semester (1.3 ↔ 2.3, 1.4 ↔ 2.4, 1.5 ↔ 2.6). An alternative once selected in the 1st semester is not selected again in the 2nd semester.

No paper codes: the official 1st-year curriculum gives no paper codes — subjects are numbered 1.1–1.6 in the 1st semester and 2.1–2.7 in the 2nd semester only.

Qualifying subject: Environmental Sciences (2.7, Q) is an audit subject — you must appear and pass, but its 60 external marks are not counted for percentage or division.

Each period is 60 minutes; each session is 16 weeks, with at least 14 effective teaching weeks. A 4-week summer internship (Internship-I) is organised after the 2nd-semester examination and is evaluated in the 3rd semester.

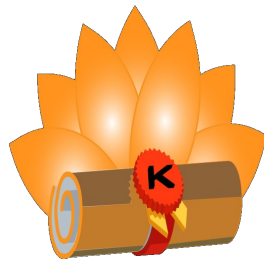
How This Helps You Later

Workshop is where you stop being only a theory student and become a practical engineer. Many students take it lightly — do not.

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Source: BTEUP 1st Year common curriculum (folder2627), corrected and approved in the C.D.C. meeting held on 16.07.2026 — scheme and subject areas verified. Topic lists follow the official syllabus; short explanations are the author's own plain-English summaries, not syllabus text. Please confirm with your own polytechnic for any local changes.





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IT Systems — First Year

BTEUP Diploma • 1st Semester (First Year — Common Curriculum) • Session 2026–27
Common Curriculum • 1st Semester • All 41 Engineering Branches

About this document: The first year of a BTEUP diploma runs on one common curriculum for 41 engineering branches, so this subject is the same whether you are in Computer Science, Mechanical, Civil or Electrical. The examination scheme below is from the official 1st-year curriculum (folder2627, NEP-2020), corrected and approved by the Board of Technical Education, U.P. Lucknow in the C.D.C. meeting held on 16.07.2026.

What This Subject Aims To Do

To build a solid base in computers — hardware, software, operating systems, the internet and everyday office tools — before branch subjects begin.

Unit-Wise Complete Topic List

Computer Fundamentals

Topics: Parts of a computer; input and output devices; memory and storage; types of software.

In simple words: What is inside a computer and how its parts work together.

Operating Systems

Topics: What an operating system does; files and folders; basic commands.

In simple words: Managing your own computer properly — the first step before the Operating Systems subject in the 3rd semester.

Internet & Email

Topics: Browsers and search; email; safe internet use; online services.

In simple words: Using the internet for study and work, and staying safe while doing it.

Office Tools

Topics: Word processing; spreadsheets; presentations.

In simple words: Documents, tables and slides — the tools behind every report, assignment and seminar.

Examination Scheme — 1st & 2nd Semester (Official, Verified 2026-27)

1st Semester — 18 Credits, 900 Marks

Sr. No.	Subject	L-T-P	Credits	Internal	External	Total
1.1	Mathematics-I	2-1-0	3	Th 40	Th 60	100
1.2	Applied Physics-I	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.3	Applied Chemistry OR Introduction to IT and AI	3-0-2 / 2-0-4	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.4	Communication Skills in English OR Fundamentals of Electrical & Electronics Engineering	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.5	Engineering Graphics OR Engineering Workshop Practice	0-0-4	2	Graphics: Pr 40 / Workshop: Pr 60	Graphics: Th 60 / Workshop: Pr 40	100
1.6	Sports & Yoga	0-0-2	1	Pr 50	—	50
—	Student Centred Activities (SCA)	0-0-10	—	Pr 50	—	50

1st Semester Total	18	—	—	900
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2nd Semester — 22 Credits, 1050 Marks

Sr. No.	Subject	L-T-P	Credits	Internal	External	Total
2.1	Mathematics-II	3-1-0	4	Th 40	Th 60	100
2.2	Applied Physics-II	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.3	Introduction to IT and AI OR Applied Chemistry	2-0-4 / 3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.4	Fundamentals of Electrical & Electronics Engineering OR Communication Skills in English	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.5	Engineering Mechanics	2-1-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.6	Engineering Workshop Practice OR Engineering Graphics	0-0-4	2	Workshop: Pr 60 / Graphics: Pr 40	Workshop: Pr 40 / Graphics: Th 60	100
2.7	(Q) Environmental Sciences	3-0-0	— (Audit)	—	Th 60*	—
—	Student Centred Activities (SCA)	0-0-4	—	Pr 50	—	50
2nd Semester Total			22	—	—	1050

About the OR choices: at Sr. No. 1.3, 1.4 and 1.5 the institute chooses which alternative runs in the 1st semester; the other alternative then runs in the 2nd semester (1.3 ↔ 2.3, 1.4 ↔ 2.4, 1.5 ↔ 2.6). An alternative once selected in the 1st semester is not selected again in the 2nd semester.

No paper codes: the official 1st-year curriculum gives no paper codes — subjects are numbered 1.1–1.6 in the 1st semester and 2.1–2.7 in the 2nd semester only.

Qualifying subject: Environmental Sciences (2.7, Q) is an audit subject — you must appear and pass, but its 60 external marks are not counted for percentage or division.

Each period is 60 minutes; each session is 16 weeks, with at least 14 effective teaching weeks. A 4-week summer internship (Internship-I) is organised after the 2nd-semester examination and is evaluated in the 3rd semester.

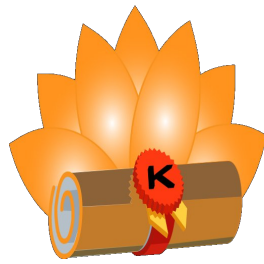
How This Helps You Later

This subject is your first step into computing — it makes the 3rd-semester subjects (Operating Systems, Web Technologies, C) much easier to pick up.

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Source: BTEUP 1st Year common curriculum (folder2627), corrected and approved in the C.D.C. meeting held on 16.07.2026 — scheme and subject areas verified. Topic lists follow the official syllabus; short explanations are the author's own plain-English summaries, not syllabus text. Please confirm with your own polytechnic for any local changes.





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Electrical & Electronics Fundamentals — First Year

BTEUP Diploma • 1st Semester (First Year — Common Curriculum) • Session 2026-27
Common Curriculum • 1st Semester • All 41 Engineering Branches

About this document: The first year of a BTEUP diploma runs on one common curriculum for 41 engineering branches, so this subject is the same whether you are in Computer Science, Mechanical, Civil or Electrical. The examination scheme below is from the official 1st-year curriculum (folder2627, NEP-2020), corrected and approved by the Board of Technical Education, U.P. Lucknow in the C.D.C. meeting held on 16.07.2026.

What This Subject Aims To Do

To explain electricity and basic electronics from the ground up — current, voltage, circuits and components — with simple experiments.

Unit-Wise Complete Topic List

Basic Electrical Concepts

Topics: Charge, current, voltage, resistance and power; Ohm's law; series and parallel circuits.

In simple words: The four quantities behind every electrical circuit, and how they relate.

AC & DC

Topics: Direct current and alternating current; single-phase AC in brief; transformers in brief.

In simple words: The two kinds of electric supply, and how voltage is changed for transmission and use.

Electronic Components

Topics: Resistors, capacitors, inductors; diodes and transistors in brief.

In simple words: The small parts that make electronic circuits work.

Measuring Instruments

Topics: Multimeter; ammeter and voltmeter; measuring voltage, current and resistance.

In simple words: Measuring a real circuit and checking whether it behaves as expected.

Examination Scheme — 1st & 2nd Semester (Official, Verified 2026-27)

1st Semester — 18 Credits, 900 Marks

Sr. No.	Subject	L-T-P	Credits	Internal	External	Total
1.1	Mathematics-I	2-1-0	3	Th 40	Th 60	100
1.2	Applied Physics-I	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.3	Applied Chemistry OR Introduction to IT and AI	3-0-2 / 2-0-4	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.4	Communication Skills in English OR Fundamentals of Electrical & Electronics Engineering	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.5		0-0-4	2	Graphics: Pr 40 /	Graphics: Th 60 /	100

	Engineering Graphics OR Engineering Workshop Practice			Workshop: Pr 60	Workshop: Pr 40	
1.6	Sports & Yoga	0-0- 2	1	Pr 50	—	50
—	Student Centred Activities (SCA)	0-0- 10	—	Pr 50	—	50
1st Semester Total			18	—	—	900

2nd Semester — 22 Credits, 1050 Marks

Sr. No.	Subject	L-T- P	Credits	Internal	External	Total
2.1	Mathematics-II	3-1- 0	4	Th 40	Th 60	100
2.2	Applied Physics-II	3-0- 2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.3	Introduction to IT and AI OR Applied Chemistry	2-0- 4 / 3-0- 2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.4	Fundamentals of Electrical & Electronics Engineering OR Communication Skills in English	3-0- 2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.5	Engineering Mechanics	2-1- 2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.6	Engineering Workshop Practice OR Engineering Graphics	0-0- 4	2	Workshop: Pr 60 / Graphics: Pr 40	Workshop: Pr 40 / Graphics: Th 60	100
2.7	(Q) Environmental Sciences	3-0- 0	— (Audit)	—	Th 60*	—
—	Student Centred Activities (SCA)	0-0- 4	—	Pr 50	—	50
2nd Semester Total			22	—	—	1050

About the OR choices: at Sr. No. 1.3, 1.4 and 1.5 the institute chooses which alternative runs in the 1st semester; the other alternative then runs in the 2nd semester (1.3 ↔ 2.3, 1.4 ↔

2.4, 1.5 ↔ 2.6). An alternative once selected in the 1st semester is not selected again in the 2nd semester.

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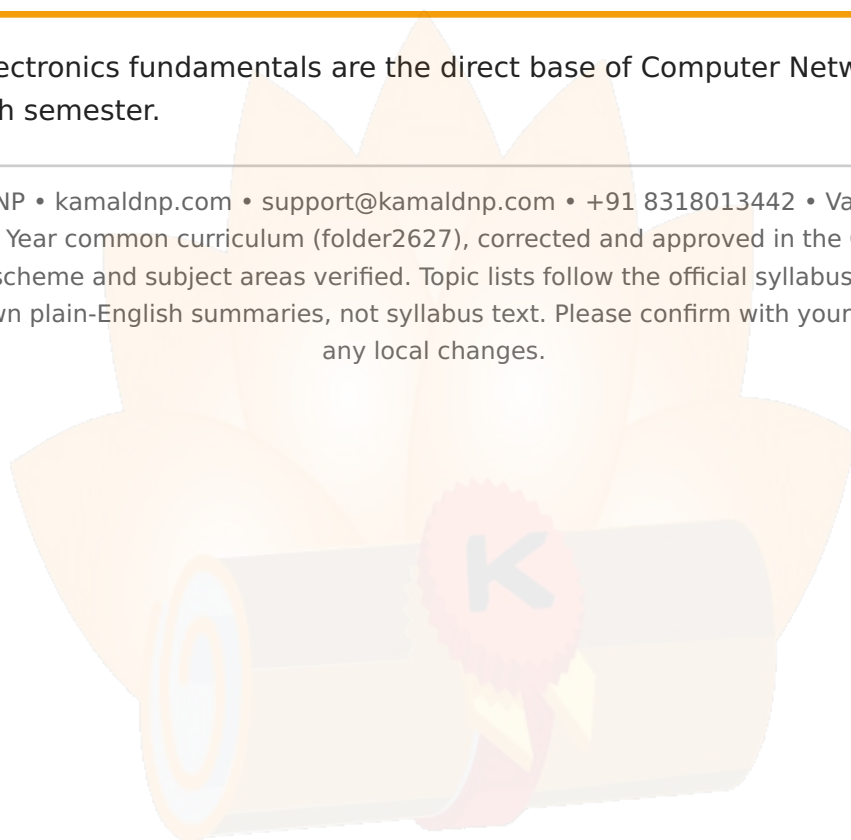
Each period is 60 minutes; each session is 16 weeks, with at least 14 effective teaching weeks. A 4-week summer internship (Internship-I) is organised after the 2nd-semester examination and is evaluated in the 3rd semester.

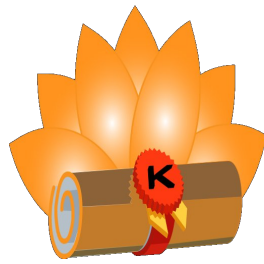
How This Helps You Later

Electrical and electronics fundamentals are the direct base of Computer Networks and the IoT subject in the 5th semester.

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Source: BTEUP 1st Year common curriculum (folder2627), corrected and approved in the C.D.C. meeting held on 16.07.2026 — scheme and subject areas verified. Topic lists follow the official syllabus; short explanations are the author's own plain-English summaries, not syllabus text. Please confirm with your own polytechnic for any local changes.





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Engineering Mechanics — First Year

BTEUP Diploma • 1st Semester (First Year — Common Curriculum) • Session 2026–27
Common Curriculum • 1st Semester • All 41 Engineering Branches

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What This Subject Aims To Do

To explain how forces act on bodies — at rest and in motion — so you can analyse simple machines and structures.

Unit-Wise Complete Topic List

Forces & Equilibrium

Topics: Types of forces; resultant and equilibrant; conditions of equilibrium.

In simple words: When things stay still and when they move — the first question of mechanics.

Friction

Topics: Laws of friction; angle of friction; friction in simple machines.

In simple words: Why things grip or slip, and how friction is used or reduced.

Laws of Motion & Simple Machines

Topics: Newton's laws; levers, pulleys and inclined planes.

In simple words: The classic machines that multiply force — still the base of mechanical design.

Centre of Gravity & Moment of Inertia

Topics: Centre of gravity of simple shapes; moment of inertia in brief.

In simple words: Where a body's weight acts, and how hard it is to turn it.

Examination Scheme — 1st & 2nd Semester (Official, Verified 2026-27)

1st Semester — 18 Credits, 900 Marks

Sr. No.	Subject	L-T-P	Credits	Internal	External	Total
1.1	Mathematics-I	2-1-0	3	Th 40	Th 60	100
1.2	Applied Physics-I	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.3	Applied Chemistry OR Introduction to IT and AI	3-0-2 / 2-0-4	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.4	Communication Skills in English OR Fundamentals of Electrical & Electronics Engineering	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.5	Engineering Graphics OR Engineering Workshop Practice	0-0-4	2	Graphics: Pr 40 / Workshop: Pr 60	Graphics: Th 60 / Workshop: Pr 40	100
1.6	Sports & Yoga	0-0-2	1	Pr 50	—	50
—	Student Centred Activities (SCA)	0-0-10	—	Pr 50	—	50

1st Semester Total	18	—	—	900
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2nd Semester — 22 Credits, 1050 Marks

Sr. No.	Subject	L-T-P	Credits	Internal	External	Total
2.1	Mathematics-II	3-1-0	4	Th 40	Th 60	100
2.2	Applied Physics-II	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.3	Introduction to IT and AI OR Applied Chemistry	2-0-4 / 3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.4	Fundamentals of Electrical & Electronics Engineering OR Communication Skills in English	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.5	Engineering Mechanics	2-1-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.6	Engineering Workshop Practice OR Engineering Graphics	0-0-4	2	Workshop: Pr 60 / Graphics: Pr 40	Workshop: Pr 40 / Graphics: Th 60	100
2.7	(Q) Environmental Sciences	3-0-0	— (Audit)	—	Th 60*	—
—	Student Centred Activities (SCA)	0-0-4	—	Pr 50	—	50
2nd Semester Total			22	—	—	1050

About the OR choices: at Sr. No. 1.3, 1.4 and 1.5 the institute chooses which alternative runs in the 1st semester; the other alternative then runs in the 2nd semester (1.3 ↔ 2.3, 1.4 ↔ 2.4, 1.5 ↔ 2.6). An alternative once selected in the 1st semester is not selected again in the 2nd semester.

No paper codes: the official 1st-year curriculum gives no paper codes — subjects are numbered 1.1–1.6 in the 1st semester and 2.1–2.7 in the 2nd semester only.

Qualifying subject: Environmental Sciences (2.7, Q) is an audit subject — you must appear and pass, but its 60 external marks are not counted for percentage or division.

Each period is 60 minutes; each session is 16 weeks, with at least 14 effective teaching weeks. A 4-week summer internship (Internship-I) is organised after the 2nd-semester examination and is evaluated in the 3rd semester.

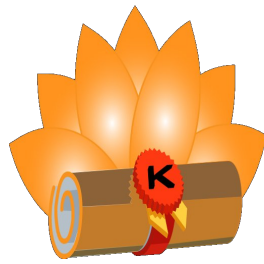
How This Helps You Later

Mechanics trains structured problem-solving — the same step-by-step thinking used in programming and in Data Structures.

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Source: BTEUP 1st Year common curriculum (folder2627), corrected and approved in the C.D.C. meeting held on 16.07.2026 — scheme and subject areas verified. Topic lists follow the official syllabus; short explanations are the author's own plain-English summaries, not syllabus text. Please confirm with your own polytechnic for any local changes.





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Environmental Science — First Year

BTEUP Diploma • 1st Semester (First Year — Common Curriculum) • Session 2026–27
Common Curriculum • 1st Semester • All 41 Engineering Branches

About this document: The first year of a BTEUP diploma runs on one common curriculum for 41 engineering branches, so this subject is the same whether you are in Computer Science, Mechanical, Civil or Electrical. The examination scheme below is from the official 1st-year curriculum (folder2627, NEP-2020), corrected and approved by the Board of Technical Education, U.P. Lucknow in the C.D.C. meeting held on 16.07.2026.

What This Subject Aims To Do

To build awareness of the environment engineers work in — pollution, resources and sustainability — and the engineer's responsibility towards them.

Unit-Wise Complete Topic List

Environment & Ecosystems

Topics: What an ecosystem is; biodiversity in brief; natural resources.

In simple words: The natural systems that engineering draws on and affects.

Pollution

Topics: Air, water, soil and noise pollution; their causes and effects; control measures.

In simple words: What pollution is, where it comes from, and how it is controlled.

Sustainability & Green Energy

Topics: Sustainable development; renewable energy sources — solar, wind, hydro.

In simple words: Meeting today's needs without taking away tomorrow's — and the clean energy that makes it possible.

Environmental Laws & Responsibility

Topics: Key environmental laws in brief; the engineer's role.

In simple words: The rules that protect the environment, and what they ask of an engineer.

Examination Scheme — 1st & 2nd Semester (Official, Verified 2026-27)

1st Semester — 18 Credits, 900 Marks

Sr. No.	Subject	L-T-P	Credits	Internal	External	Total
1.1	Mathematics-I	2-1-0	3	Th 40	Th 60	100
1.2	Applied Physics-I	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.3	Applied Chemistry OR Introduction to IT and AI	3-0-2 / 2-0-4	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.4	Communication Skills in English OR Fundamentals of Electrical & Electronics Engineering	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.5	Engineering Graphics OR Engineering Workshop Practice	0-0-4	2	Graphics: Pr 40 / Workshop: Pr 60	Graphics: Th 60 / Workshop: Pr 40	100
1.6	Sports & Yoga	0-0-2	1	Pr 50	—	50
—	Student Centred Activities (SCA)	0-0-10	—	Pr 50	—	50

1st Semester Total	18	—	—	900
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2nd Semester — 22 Credits, 1050 Marks

Sr. No.	Subject	L-T-P	Credits	Internal	External	Total
2.1	Mathematics-II	3-1-0	4	Th 40	Th 60	100
2.2	Applied Physics-II	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.3	Introduction to IT and AI OR Applied Chemistry	2-0-4 / 3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.4	Fundamentals of Electrical & Electronics Engineering OR Communication Skills in English	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.5	Engineering Mechanics	2-1-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.6	Engineering Workshop Practice OR Engineering Graphics	0-0-4	2	Workshop: Pr 60 / Graphics: Pr 40	Workshop: Pr 40 / Graphics: Th 60	100
2.7	(Q) Environmental Sciences	3-0-0	— (Audit)	—	Th 60*	—
—	Student Centred Activities (SCA)	0-0-4	—	Pr 50	—	50
2nd Semester Total			22	—	—	1050

About the OR choices: at Sr. No. 1.3, 1.4 and 1.5 the institute chooses which alternative runs in the 1st semester; the other alternative then runs in the 2nd semester (1.3 ↔ 2.3, 1.4 ↔ 2.4, 1.5 ↔ 2.6). An alternative once selected in the 1st semester is not selected again in the 2nd semester.

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Qualifying subject: Environmental Sciences (2.7, Q) is an audit subject — you must appear and pass, but its 60 external marks are not counted for percentage or division.

Each period is 60 minutes; each session is 16 weeks, with at least 14 effective teaching weeks. A 4-week summer internship (Internship-I) is organised after the 2nd-semester examination and is evaluated in the 3rd semester.

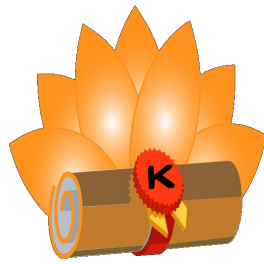
How This Helps You Later

Every project today is judged on its environmental impact too — this subject teaches you to think that way from the start.

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Sports & Yoga — First Year

BTEUP Diploma • 1st Semester (First Year — Common Curriculum) • Session 2026–27
Common Curriculum • 1st Semester • All 41 Engineering Branches

About this document: The first year of a BTEUP diploma runs on one common curriculum for 41 engineering branches, so this subject is the same whether you are in Computer Science, Mechanical, Civil or Electrical. The examination scheme below is from the official 1st-year curriculum (folder2627, NEP-2020), corrected and approved by the Board of Technical Education, U.P. Lucknow in the C.D.C. meeting held on 16.07.2026.

What This Subject Aims To Do

To build physical fitness, discipline and focus through sports and yoga, alongside academic study.

Unit-Wise Complete Topic List

Physical Fitness

Topics: Warm-up and exercise; games and sports activities.

In simple words: Staying fit and active — the base of steady study and work.

Yoga

Topics: Asanas, pranayama and meditation in brief; benefits for concentration and health.

In simple words: Simple practices that improve focus, calm and stamina.

Teamwork & Discipline

Topics: Playing in a team; following rules; sportsmanship.

In simple words: The discipline and teamwork that employers value as much as marks.

Health Awareness

Topics: Balanced diet; sleep; avoiding harmful habits.

In simple words: Looking after the body that has to carry you through the diploma and beyond.

Examination Scheme — 1st & 2nd Semester (Official, Verified 2026-27)

1st Semester — 18 Credits, 900 Marks

Sr. No.	Subject	L-T-P	Credits	Internal	External	Total
1.1	Mathematics-I	2-1-0	3	Th 40	Th 60	100
1.2	Applied Physics-I	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.3	Applied Chemistry OR Introduction to IT and AI	3-0-2 / 2-0-4	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.4	Communication Skills in English OR Fundamentals of Electrical & Electronics Engineering	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
1.5	Engineering Graphics OR Engineering Workshop Practice	0-0-4	2	Graphics: Pr 40 / Workshop: Pr 60	Graphics: Th 60 / Workshop: Pr 40	100
1.6	Sports & Yoga	0-0-2	1	Pr 50	—	50
—	Student Centred Activities (SCA)	0-0-10	—	Pr 50	—	50

1st Semester Total	18	—	—	900
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2nd Semester — 22 Credits, 1050 Marks

Sr. No.	Subject	L-T-P	Credits	Internal	External	Total
2.1	Mathematics-II	3-1-0	4	Th 40	Th 60	100
2.2	Applied Physics-II	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.3	Introduction to IT and AI OR Applied Chemistry	2-0-4 / 3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.4	Fundamentals of Electrical & Electronics Engineering OR Communication Skills in English	3-0-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.5	Engineering Mechanics	2-1-2	4	Th 40 + Pr 60	Th 60 + Pr 40	200
2.6	Engineering Workshop Practice OR Engineering Graphics	0-0-4	2	Workshop: Pr 60 / Graphics: Pr 40	Workshop: Pr 40 / Graphics: Th 60	100
2.7	(Q) Environmental Sciences	3-0-0	— (Audit)	—	Th 60*	—
—	Student Centred Activities (SCA)	0-0-4	—	Pr 50	—	50
2nd Semester Total			22	—	—	1050

About the OR choices: at Sr. No. 1.3, 1.4 and 1.5 the institute chooses which alternative runs in the 1st semester; the other alternative then runs in the 2nd semester (1.3 ↔ 2.3, 1.4 ↔ 2.4, 1.5 ↔ 2.6). An alternative once selected in the 1st semester is not selected again in the 2nd semester.

No paper codes: the official 1st-year curriculum gives no paper codes — subjects are numbered 1.1–1.6 in the 1st semester and 2.1–2.7 in the 2nd semester only.

Qualifying subject: Environmental Sciences (2.7, Q) is an audit subject — you must appear and pass, but its 60 external marks are not counted for percentage or division.

Each period is 60 minutes; each session is 16 weeks, with at least 14 effective teaching weeks. A 4-week summer internship (Internship-I) is organised after the 2nd-semester examination and is evaluated in the 3rd semester.

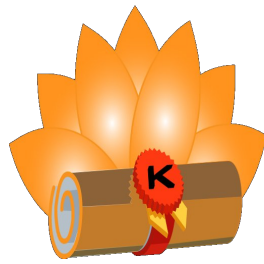
How This Helps You Later

A diploma is a marathon, not a sprint — fitness and focus decide how well you finish it.

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Source: BTEUP 1st Year common curriculum (folder2627), corrected and approved in the C.D.C. meeting held on 16.07.2026 — scheme and subject areas verified. Topic lists follow the official syllabus; short explanations are the author's own plain-English summaries, not syllabus text. Please confirm with your own polytechnic for any local changes.





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Operating Systems — Complete Syllabus

BTEUP Diploma in Computer Science & Engineering • 3rd Semester • Session 2026–27
Subject 3.1 (Theory) + 3.5 (Lab) • Total 200 Marks • 4 Credits

About this document: Operating Systems appears twice in the 3rd semester — as a theory paper (3.1) and as a lab (3.5). Both are covered here, completely, in the official order.

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
3.1	Operating Systems	Theory	3 - 0	3	Theory 40	Theory 60 (3 hrs)	100
3.5	Operating Systems (Lab)	Practical	0 - 2	1	Practical 60	Practical 40 (3 hrs)	100
Operating Systems Total				4	100	100	200

What This Subject Aims To Do

To give a general introduction to how operating systems are actually built — the ideas behind them and the choices available — so that you can compare different designs and judge the trade-offs between them. By the end you should be able to: explain the functional architecture of an OS; explain process management and compare CPU scheduling algorithms; explain memory management; explain the I/O system and compare disk scheduling algorithms; and classify file systems and directory implementations.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
1	Overview of Operating System	6	14%
2	Process Management	10	25%
3	Memory Management	10	25%
4	I/O System	8	18%
5	File Management	8	18%

Unit 1 — Overview of Operating System (6 Periods, 14%)

Topics: Introduction; different types of operating systems; functions and services of an OS; UNIX/Linux architecture; kernel; services and system calls; system programs.

In simple words: What an operating system is, what jobs it does, and how it is built inside — the kernel, system calls, and the UNIX/Linux way of organising it all.

Unit 2 — Process Management (10 Periods, 25%)

Topics: Process concepts; operations on processes; CPU scheduling; scheduling algorithms; IPC (inter-process communication); process synchronisation; critical section; deadlock — condition, avoidance and prevention.

In simple words: A running program is a process, and a computer juggles many at once. How the CPU is shared fairly, how processes share data safely, and the deadlock problem — when processes wait forever on each other — and how to avoid or prevent it.

Unit 3 — Memory Management (10 Periods, 25%)

Topics: Memory allocation; First Fit, Best Fit and Worst Fit; swapping; paging and segmentation; page faults; page replacement algorithms; fragmentation and compaction; concept of virtual memory.

In simple words: RAM is limited, so the OS must decide which process gets which part of memory — allocation strategies, paging, page faults and replacement, fragmentation, and virtual memory, the trick that lets programs behave as if they have more memory than the machine really has.

Unit 4 — I/O System (8 Periods, 18%)

Topics: Mass storage structure — overview; disk structure; disk attachment; disk scheduling algorithms; swap space management; RAID types.

In simple words: Storage hardware, mainly hard disks: how a disk is organised, how the OS orders disk requests, how swap space is managed, and RAID — combining several disks for speed or safety.

Unit 5 — File Management (8 Periods, 18%)

Topics: Concept of a file; access methods; directory structure; file system mounting; file sharing and protection; file system structure and implementation; directory implementation; free-space management; efficiency and performance; different types of file systems.

In simple words: Files and folders look simple to a user, but underneath the OS must organise them, find them fast, share them safely, protect them, and track free disk space.

Practical Work

- Practice of various Linux/Unix commands — man, cp, mv, ln, rm, unlink, mkdir, rmdir, etc.
- Format and install the Windows Operating System.
- Use Task Manager to monitor and terminate processes; understand process priorities.
- Simulate CPU scheduling algorithms: FCFS, SJF, Round Robin, Priority.
- Simulate the Dining Philosophers problem.
- Simulate Banker's Algorithm for Deadlock Avoidance.
- Simulate Banker's Algorithm for Deadlock Prevention.
- Simulate contiguous memory allocation: Worst Fit, Best Fit, First Fit.
- Simulate page replacement algorithms: FIFO, LRU, Optimal.
- Simulate disk scheduling algorithms: FCFS, SCAN, C-SCAN.
- Simulate file organisation techniques: Single-level directory, Two-level directory.
- Simulate file allocation strategies: Sequential, Indexed, Linked.

Reference Books (as listed in the syllabus)

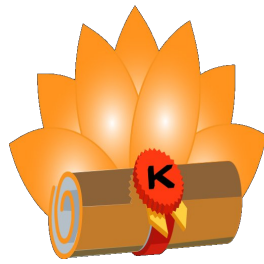
- Operating System Concepts — Silberschatz and Galvin, Wiley India
- UNIX Concepts and Applications — Sumitabha Das, McGraw-Hill Education
- Operating Systems, Internals and Design Principles — Stallings, Pearson Education, India
- Operating System Concepts — Ekta Walia, Khanna Publishing House
- Modern Operating Systems — Andrew S. Tanenbaum, Prentice Hall of India

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Source: BTEUP 2nd Year curriculum (folder2627), approved in C.D.C. meeting held on 16.07.2026. Topic lists follow the official syllabus; short explanations are the author's own plain-English summaries, not syllabus text.

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Database Management System — Complete Syllabus

BTEUP Diploma in Computer Science & Engineering • 3rd Semester • Session 2026-27
Subject 3.2 (Theory) + 3.6 (Lab) • Total 200 Marks • 5 Credits

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
3.2	Database Management System	Theory	3 - 0	3	Theory 40	Theory 60 (3 hrs)	100
3.6	Database Management System (Lab)	Practical	0 - 4	2	Practical 60	Practical 40 (3 hrs)	100
DBMS Total				5	100	100	200

What This Subject Aims To Do

To cover the development of database-driven applications using modern database management software — including conceptual modelling, relational database design and database query languages. By the end you should be able to: describe DBMS fundamentals, installation and working; understand keys and data models; understand the relational model and relational algebra; design a relational database; and apply SQL commands to create, insert, retrieve, update and delete data.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
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1	Introduction	6	10%
2	Data Model and Keys	8	25%
3	Relational Model	10	25%
4	Relational Database Design	10	25%
5	SQL / MySQL	8	15%

Unit 1 — Introduction (6 Periods, 10%)

Topics: Database system concepts and architecture; components of DBMS; table structure; schema definition; three views of data (external view, conceptual view, internal view).

In simple words: What a database system is, what parts it has, and the three ways of looking at the same data — what the user sees, how it is designed, and how it is actually stored.

Unit 2 — Data Model and Keys (8 Periods, 25%)

Topics: Data model definition; network model, hierarchical model, E-R model; advantages and disadvantages of each data model; concept of keys (primary, candidate, super, foreign); constraints; strong entity set and weak entity set.

In simple words: Different ways to model data, how tables are linked through keys, and the rules (constraints) that keep data correct.

Unit 3 — Relational Model (10 Periods, 25%)

Topics: The relational data model and relational database constraints; ER/EER to relational model mapping; relational algebra and relational calculus; basic operations (union, intersection, difference, Cartesian product); additional operations (projection, selection, division, rename, join).

In simple words: The maths behind tables: how to combine, filter and join tables to get exactly the data you want — this is the theory behind every SQL query.

Unit 4 — Relational Database Design (10 Periods, 25%)

Topics: Functional dependencies and normalisation for relational databases; types of normalisation (1NF, 2NF, 3NF, multivalued dependencies and BCNF, fourth normal form, fifth normal form).

In simple words: How to design tables so data is not repeated unnecessarily and cannot become inconsistent — the rules that turn a messy table into a clean database.

Unit 5 — SQL / MySQL (8 Periods, 15%)

Topics: MySQL data types; data definition commands; data manipulation commands; data retrieval commands; types of operators — arithmetic, comparison and logical operators.

In simple words: The actual SQL language: creating tables, inserting and changing data, and asking questions of the database.

Practical Work

- Install and configure a database system (MySQL through XAMPP Server, MySQL, PostgreSQL, or SQLite).
- Design an ER model for a Library Management System.
- Study the different properties present in an ER model.
- Creating a database and a table; specifying relational data types, constraints and indexes.
- Table and record handling: INSERT, SELECT with INSERT, DELETE, UPDATE, TRUNCATE, DROP and ALTER statements.
- Retrieving data: SELECT, WHERE clause, logical operators, IN, BETWEEN, LIKE, ORDER BY, GROUP BY and HAVING clauses, aggregate functions, and combining tables using JOINS.
- Case study 1: SQL — Library Management System (books, members, authors, publishers).
- Case study 2: SQL — Employee Database (department, salary, joining date queries).
- Case study 3: SQL — Bookstore Inventory (genre, price and stock queries).
- Case study 4: SQL — Student Grades Database (grade-wise retrieval, averages, updates and deletions).

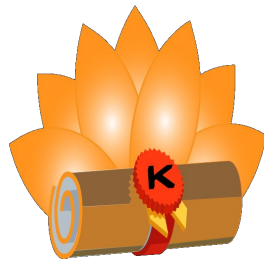
Reference Books (as listed in the syllabus)

- Fundamentals of Database Systems — Elmasri & Navathe, Pearson Education
- Database Management Systems — Raghu Ramakrishnan & Johannes Gehrke, Tata McGraw-Hill
- Database System Concepts — Silberschatz, Korth & Sudarshan, McGraw-Hill
- Introduction to Database Systems — C. J. Date, Pearson Education
- Introduction to SQL — Rick F. van der Lans, Pearson Education

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Computer Network — Complete Syllabus

BTEUP Diploma in Computer Science & Engineering • 3rd Semester • Session 2026-27

Subject 3.3 (Practicum) • Total 100 Marks • 4 Credits • L 2 - P 4

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
3.3	Computer Network	Practicum	2 - 4	4	40	60 (3 hrs)	100
Computer Network Total				4	40	60	100

What This Subject Aims To Do

To understand the functioning of computer networks and popular networking protocols. By the end you should be able to: explain data communication fundamentals; describe the physical layer and data link layer; explain IP addressing and key network-layer protocols; describe the transport layer; and recognise network devices and network management systems.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
1	Introduction	6	12%
2	Data Communication and Communication Methodologies	10	25%
3	Network Layer	10	25%
4	Transport Layer	8	25%
5	Network Devices	8	13%

Unit 1 — Introduction (6 Periods, 12%)

Topics: Introduction to computer networks; network models — OSI reference model, TCP/IP model.

In simple words: The two famous layered models that explain how data travels from one computer to another, layer by layer.

Unit 2 — Data Communication and Communication Methodologies (10 Periods, 25%)

Topics: Transmission media — principles, issues and examples; wired media (coaxial, UTP, STP, fibre optic cables); wireless media (HF, VHF, UHF, microwave, Ku band); network topologies; data link layer — design issues and example protocols (Ethernet, WLAN, Bluetooth); switching techniques (circuit, packet, message).

In simple words: The physical ways data travels — cables and wireless — the shapes networks take, and how data is switched from sender to receiver.

Unit 3 — Network Layer (10 Periods, 25%)

Topics: Network layer — design issues and example protocols (IPv4); concept of IPv6; routing principles, issues, algorithms (distance-vector, link-state) and protocols (RIP, OSPF).

In simple words: How data finds its way across many networks: IP addresses, IPv6, and the routing algorithms that choose the path.

Unit 4 — Transport Layer (8 Periods, 25%)

Topics: Transport layer — design issues and example protocols (TCP/UDP); application layer protocols (SMTP, DNS).

In simple words: Reliable vs fast delivery (TCP vs UDP), and the everyday application protocols behind email and website names.

Unit 5 — Network Devices (8 Periods, 13%)

Topics: Functioning of network devices — NIC, hub, bridge, switch, router, WiFi devices; network management system and example protocol (SNMP).

In simple words: What each box in a network actually does, and how whole networks are monitored and managed.

Practical Work

- Study a network simulation tool (Wireshark, Cisco Packet Tracer, NS-2, GNS3, etc.).
- Observe how data travels through the OSI layers using network tools.
- Show various types of networking cables and connectors and identify them clearly.
- Study specifications of cables and connectors of various companies on the internet and find out the differences.
- Make patch cords using different types of cables and connectors — crimping, splicing, etc.
- Demonstrate different types of cable testers and use them for testing patch cords.
- Configure computing devices (PC, laptop, mobile) for a network — IP address, gateway, DNS and security options.
- TCP communication between two devices.
- Show various networking devices — NICs, hub, bridge, switch, router, gateway, WiFi access point, etc.
- Study specifications of various networking devices of various companies on the internet and find out the differences.

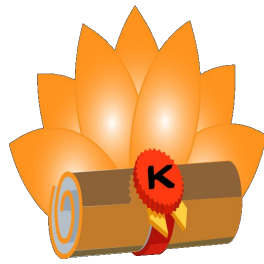
Reference Books (as listed in the syllabus)

- Computer Networks, 4th Edition (or later) — Andrew S. Tanenbaum, PHI
- TCP/IP Illustrated, Volume 1 — W. Richard Stevens, Addison Wesley
- Data and Computer Communications — William Stallings, PHI
- An Engineering Approach to Computer Networking — S. Keshav, Pearson
- An Integrated Approach to Computer Networks — Bhavneet Sidhu, Khanna Publishing House
- Data Communications and Networking — Behrouz A. Forouzan, McGraw-Hill
- Cisco Press books on CCNA

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Web Technologies — Complete Syllabus

BTEUP Diploma in Computer Science & Engineering • 3rd Semester • Session 2026-27
Subject 3.4 (Practicum) • Total 100 Marks • 3 Credits • L 1 - P 4

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
3.4	Web Technologies	Practicum	1 - 4	3	Practical 60	Practical 40 (3 hrs)	100
Web Technologies Total				3	60	40	100

What This Subject Aims To Do

To enable students to design professional, database-backed, dynamic and feature-based websites, using programming with PHP applications — a broad but practical introduction to server-side web technologies. By the end you should be able to: analyse a webpage and identify its elements and attributes; create webpages using HTML; use Cascading Style Sheets; build dynamic webpages using JavaScript (client-side); and build dynamic webpages using PHP (server-side).

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
1	Web Development Introduction	2	10%
2	HTML Basics	3	25%
3	Cascading Style Sheets	3	15%

4	JavaScript	3	25%
5	PHP	3	25%

Unit 1 — Web Development Introduction (2 Periods, 10%)

Topics: WWW, internet, browser, search engine; client-server model; URL; web pages, website and web services; types of websites (static, dynamic, responsive); developer options of browser (view page source, developer tools, inspect element).

In simple words: How the web works end to end, and the browser tools professionals use every day to inspect and debug a site.

Unit 2 — HTML Basics (3 Periods, 25%)

Topics: HTML document and basic structure; syntax; HTML tags and attributes; types of tags; rules of nesting; basic tags; page formatting (paragraph, line break, blank space, background, div and span); text formatting (headings, bold, italic, marked, small, deleted, inserted, subscript, superscript); comments; horizontal lines; lists (ordered, unordered, definition); images, text links, image links, opening a page in a new window/tab, linking within a page; table tags, frames and iframe; HTML forms.

In simple words: The building blocks of every webpage: structure, text, images, links, lists, tables and forms.

Unit 3 — Cascading Style Sheets (3 Periods, 15%)

Topics: Introduction and benefits of CSS; CSS syntax; CSS implementation (inline, internal, external); CSS selectors (ID, class, grouping, universal, pseudo-classes); CSS properties (background colour/image, border style, height, width, colour, text-align, font family/style/size, font-weight); box model in CSS (margin, border, padding).

In simple words: How to make pages look good: colours, fonts, spacing and layouts, without changing the HTML structure.

Unit 4 — JavaScript (3 Periods, 25%)

Topics: JavaScript introduction; variables, data types, operators; control flow (if-else, for loop, while loop, do-while loop); declaring functions and calling functions with parameters; adding JavaScript to web documents; JavaScript objects; Document Object Model; HTML events and calling JavaScript functions on events.

In simple words: How to make pages interactive in the browser: checking inputs, responding to clicks, and changing the page without reloading it.

Unit 5 — PHP (3 Periods, 25%)

Topics: Server-side scripting; arrays, functions and forms; advanced PHP; databases — basic commands with PHP examples, connection to server, creating a database, selecting a database, listing databases and table names, creating a table, inserting data, altering tables, queries, deleting a database, deleting data and tables; phpMyAdmin and database bugs.

In simple words: The server side: how a website talks to a database, saves form data, and builds pages dynamically for each visitor.

Practical Work

- Install, configure and start using developer tools / code editor / browser.
- Pick any three websites and categorise them as static, dynamic or responsive, with reasons.
- List five web browsers and search engines.
- Open a website using Chrome Developer Tools; modify the text and background colour of a paragraph and take a screenshot.
- Create an HTML file with your name, a brief bio, an image and a list of hobbies.
- Design an HTML table listing five products with names, prices and descriptions.
- Build an HTML form with name, email, message, radio buttons, a newsletter checkbox and a submit button.
- Style elements using element, class, ID and pseudo-class selectors.
- Create a navigation bar using Flexbox, with a logo and evenly spaced links.
- Create a webpage layout using CSS Grid (header, sidebar, main content, footer).
- Write a JavaScript program that rates a password as Weak, Medium or Strong based on length.
- Validate a form for a valid email and a password (minimum 8 characters, at least one number).
- Practising PHP: basics; web development application; MySQL.
- Installation of WAMP/XAMPP Server.

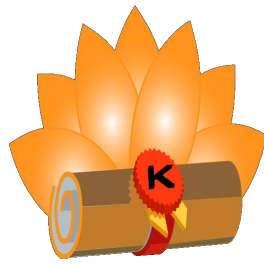
Reference Books (as listed in the syllabus)

- Web Technologies — A Computer Science Perspective — Jeffrey C. Jackson
- Internet & World Wide Web: How to Program — Deitel, Deitel & Goldberg, Pearson Education
- Web Programming: Building Internet Applications — Chris Bates
- Web Applications: Concepts and Real World Design — Knuckles

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Computer Programming Using C — Complete Syllabus

BTEUP Diploma in Computer Science & Engineering • 3rd Semester • Session 2026-27
Subject 3.7 (Practicum) • Total 100 Marks • 3 Credits • L 1 - P 4

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
3.7	Computer Programming Using C	Practicum	1 - 4	3	Practical 60	Practical 40 (3 hrs)	100
C Programming Total				3	60	40	100

What This Subject Aims To Do

To enable students to develop structured solutions to problems and implement them using computers — first formulating a solution as a well-defined sequence of actions, then expressing it in a programming language. By the end you should be able to: demonstrate knowledge of C programming concepts; develop simple programs using basic constructs; develop programs using conditional and looping concepts; understand multi-dimensional arrays and strings; and design modular C programs with reusable functions and pointers for better readability and maintainability.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
1	Introduction to Problem Solving	2	20%

2	Operators & Expression	3	20%
3	Conditional & Looping Statements	3	20%
4	Arrays & String	3	20%
5	Function & Pointer	3	20%

Unit 1 — Introduction to Problem Solving (2 Periods, 20%)

Topics: Computational way of thinking; flowchart and algorithm; variable, constant and representation; data types; keywords; identifier.

In simple words: Before writing code, learn to think step by step: break a problem into actions, draw it as a flowchart, and name your data properly.

Unit 2 — Operators & Expression (3 Periods, 20%)

Topics: Arithmetic, relational, logical and bitwise operators; input and output; expressions; data type casting.

In simple words: The symbols that do the work in a program — maths, comparisons, logic — and how values change type.

Unit 3 — Conditional & Looping Statements (3 Periods, 20%)

Topics: if, if-else, if-else ladder, switch-case, break and continue; loops — for, while, do-while and nested loops.

In simple words: How a program makes decisions and repeats work: the two ideas behind almost every program you will ever write.

Unit 4 — Arrays & String (3 Periods, 20%)

Topics: Introduction to arrays; array declaration; length of array; manipulating array elements; single and multi-dimensional arrays; arrays of characters; introduction to strings; string declaration and definition; string functions (strlen, strcpy, strcmp).

In simple words: How to store many values together — lists, tables (matrices) and text — and the ready-made functions for handling strings.

Unit 5 — Function & Pointer (3 Periods, 20%)

Topics: Introduction to functions; global and local variables; function declaration, call and return; types of functions; standard functions; introduction to pointers; parameters and parameter passing; call by value / reference; recursive function; I/O and formatting.

In simple words: How to split a big program into small reusable pieces, and pointers — the concept that lets a function change data outside itself, and that every later language builds on.

Practical Work

- Installation of a C compiler; familiarisation with the programming environment and its options/menus.
- Draw a flowchart using MS Word or any other editor / online tool (e.g. Draw.io).
- Programs using I/O statements and various operators: print your name; arithmetic and logical operators; swap two numbers with and without a third variable.
- Programs using expression evaluation and precedence: unary and ternary operators; post- and pre-increment operators.
- Programs using decision making and branching: odd/even check; prime number check; largest of three numbers.
- Programs using loops: factorial; table of a number; prime numbers from 1 to 100; Fibonacci series up to n; different star patterns.
- Programs using n-dimensional arrays: print a 3×3 matrix; transpose of a 3×3 matrix; addition of two matrices.
- Programs using string functions: length of a string; concatenation of two strings; palindrome check for a string/number.
- Programs using parameter passing: user-defined function to add two numbers; call by value; call by reference.
- Programs using recursion: factorial using recursion.
- Programs using pointers: print the address of a variable using a pointer; swap the contents of two variables using a pointer.

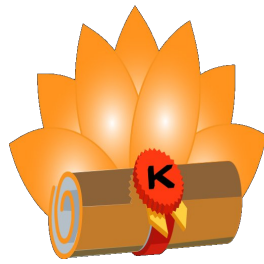
Reference Books (as listed in the syllabus)

- Let Us C — Yashavant Kanetkar
- Problem Solving and Programming in C — R. S. Salaria, Khanna Publishing House
- C Programming: Absolute Beginner's Guide — Dean Miller & Greg Perry
- The C Programming Language — Kernighan & Ritchie, Prentice Hall of India
- Programming in ANSI C — E. Balagurusamy, Tata McGraw-Hill
- C Programming & Data Structures — B. A. Forouzan & R. F. Gilberg, CENGAGE Learning
- Outline of Programming with C — Byron Gottfried, Schaum, McGraw-Hill

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Summer Internship-I & Student Centred Activities — 3rd Semester

BTEUP Diploma in Computer Science & Engineering • 3rd Semester • Session 2026-27
Subject 3.8 (Internship) 50 Marks • SCA 50 Marks • Total 100 Marks

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
3.8	Summer Internship-I (4 weeks after 2nd Sem.)	Internship	—	2	50	—	50
—	Student Centred Activities (SCA)	Activity	0 - 8	—	50	—	50
Internship + SCA Total				2	100	—	100

Summer Internship-I — What It Is

Industrial training during the semester break after the 2nd semester examinations, for 4 weeks (the scheme also mentions a 4-6 week duration). It gives students an opportunity to experience the environment and culture of industrial production units and commercial activities in field organisations, and to integrate theory with practice. The concerned HOD, along with other teachers, guides students in arranging appropriate training places relevant to their branch. An internship schedule is drawn up for each student before starting, in consultation with the training provider, and students are briefed in advance about the organisational setup, product range, manufacturing process, and important machines and materials used.

Students keep a daily report in a diary during training, which later becomes the final report and its presentation. Evaluation is through the internship report and viva-voce/presentation,

assessing understanding of materials, industrial processes and practices, problem-solving ability in an industrial setup, and application of knowledge in real-life situations.

How Internship-I Is Marked (50 Marks)

- Punctuality and regularity — 15%
- Initiative in learning new things — 15%
- Presentation and viva — 15%
- Industrial training report — 55%

Student Centred Activities (SCA) — 50 Marks

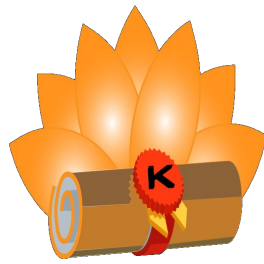
A provision for overall personality development, including co-curricular activities such as extension lectures, games, hobby clubs (for example photography, painting and singing), seminars, declamation contests, educational field visits, NCC, NSS, library work, cultural activities and self-study.

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4th Semester — Computer Science & Engineering

2nd Year • BTEUP Diploma in Computer Science & Engineering

Session 2026-27 • NEP-2020

4th Semester — names only, for now. The subject names below are verified for the BTEUP CSE 4th semester, 2026-27. The detailed syllabus, paper codes, marks, credits and L-P hours for this semester have NOT yet been verified from the official BTEUP curriculum, so they are deliberately not printed here. The detailed 4th-semester pages will be added to this PDF once they are verified — please confirm with your own polytechnic in the meantime.

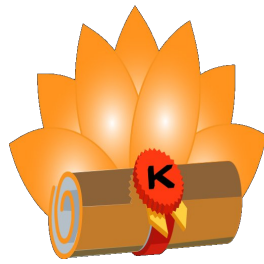
4th Semester Subjects (Verified Names)

- **Data Structures Using C**
- **Software Engineering**
- **Introduction to E-Governance**
- **Program Elective-I: Computer System Organization or Free and Open Source Systems (FOSS)**
- **Open Elective-I: Project Management or Industrial Robotics**
- **Data Structures Using C Lab**
- **Scripting Languages (Python)**
- **Essence of Indian Knowledge and Tradition**

Program Elective-I: choose Computer System Organization OR Free and Open Source Systems (FOSS), whichever your institute offers. Open Elective-I: choose Project Management OR Industrial Robotics, or an Advance Skill Development certification, as offered by your institute.

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Object Oriented Programming Using Java — Complete Syllabus

BTEUP Diploma in Computer Science & Engineering • 5th Semester • Session 2026-27
Subject 5.1 (Practicum) • Total 100 Marks • 3 Credits • L 1 - P 4

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
5.1	Object Oriented Programming Using Java	Practicum	1 - 4	3	60	Practical 40 (3 hrs)	100
Java Total				3	60	40	100

What This Subject Aims To Do

To offer the modern programming language Java so students can implement object-orientation practically and program in object-oriented technology using Java. By the end you should be able to: install a Java IDE, compiler and Java virtual machines and understand basic Java concepts; implement basic Java programs; explain and implement object-oriented programming; explain and implement abstract classes, interfaces and polymorphism; and understand exceptions and develop multithreaded programs.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
1	Introduction and Features	2	15%
2	Language Constructs	3	15%

3	Classes and Objects	3	30%
4	Abstract Class, Interface and Polymorphism	3	20%
5	Exception Handling and Multithreading	3	20%

Unit 1 — Introduction and Features (2 Periods, 15%)

Topics: Fundamentals of object-oriented programming — procedure-oriented vs object-oriented programming (OOP); OOP concepts — classes, object, object reference, abstraction, encapsulation, inheritance, polymorphism; introduction of Eclipse (IDE) for developing programs in Java.

In simple words: Why OOP exists, how it differs from the older procedure-based style, and the core vocabulary — class, object, inheritance, polymorphism — plus your first tool, the Eclipse IDE.

Unit 2 — Language Constructs (3 Periods, 15%)

Topics: Variables; data types — integer, floating point, character, boolean; operators; iteration and jump statements; conditional expressions; input using Scanner class and output statements; loops; switch-case; arrays; introduction to methods.

In simple words: The Java basics: storing values, making decisions, repeating work, reading input, and grouping code into methods.

Unit 3 — Classes and Objects (3 Periods, 30%)

Topics: Class fundamentals; constructors; declaring objects (object and object reference); creating and accessing variables and methods; static and non-static variables/methods; defining packages; creating and accessing a package; importing packages; understanding CLASSPATH; auto-boxing; String and StringBuffer. Inheritance: definition; protected/private/public data; constructor chaining; order of invocation; types of inheritance (single, multilevel, hierarchical, hybrid); access control (private vs public vs protected vs default).

In simple words: The heart of the subject — and the heaviest-weighted unit. How to build classes, how objects are created, how code is organised into packages, and how one class inherits from another.

Unit 4 — Abstract Class, Interface and Polymorphism (3 Periods, 20%)

Topics: Defining an interface; key points of abstract class and interface; difference between an abstract class and an interface; implementation of multiple inheritance through interface; method and constructor overloading; method overriding; up-casting and down-casting.

In simple words: How Java handles the tricky parts: partial blueprints (abstract classes), pure contracts (interfaces), and the same method name behaving differently — polymorphism.

Unit 5 — Exception Handling and Multithreading (3 Periods, 20%)

Topics: Definition of exception handling; implementation of keywords try, catch, finally, throw and throws; built-in exceptions; difference between multi-threading and multi-tasking; thread life cycle; creating threads; thread priorities.

In simple words: How programs survive errors gracefully instead of crashing, and how one program can do several things at the same time with threads.

Practical Work

- WAP to create a simple class to find out the area and perimeter of a rectangle and a box, using super and this keywords.
- WAP to design a class Account using inheritance and static members, showing all functions of a bank (withdrawal, deposit).
- WAP to design a class using abstract methods and classes.
- WAP to design a String class that performs string methods (equal, reverse the string, change case).
- Consider a class of Cars under which Santro Xing, Alto and Wagon R are individual objects, each with model, year of manufacture, colour, top speed, etc. as properties and Create(), Sold() and display() as methods of the Car class.
- In a software company, Software Engineers, Sr. Software Engineers, Module Leads, Technical Leads, Project Leads, Project Managers, Program Managers and Directors are all employees but differ in work, perks, roles and responsibilities. Create an Employee base class providing common behaviours/properties that all employees must have.
- Using multiple inheritance, create classes: Shape, Circle, Square, Cube, Sphere and Cylinder, with specified class variables, constructors and base classes, with Area and/or Volume methods.
- WAP to handle exceptions using try and multiple catch blocks.
- WAP that implements nested try statements.

- WAP to create a package that accesses members of an external class as well as of the same package.
- WAP that shows the partial implementation of an interface.
- WAP to create a thread that implements the Runnable interface.

Reference Books (as listed in the syllabus)

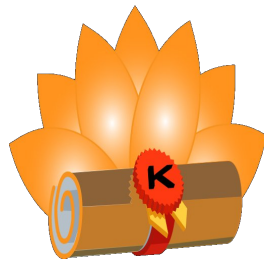
- Programming with Java: A Primer — E. Balagurusamy
- Head First Java — Kathy Sierra & Bert Bates, O'Reilly
- OCA Java SE Programmer I Certification Guide — Mala Gupta, Wiley
- Programmer's Guide to Java SE 8 — Khalid A. Mughal, Pearson

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Fundamentals of Internet of Things — Complete Syllabus

BTEUP Diploma in Computer Science & Engineering • 5th Semester • Session 2026-27
Subject 5.2 (Practicum) • Total 100 Marks • 3 Credits • L 1 - P 4

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
5.2	Fundamentals of Internet of Things	Practicum	1 - 4	3	60	Practical 40 (3 hrs)	100
IoT Total				3	60	40	100

What This Subject Aims To Do

IoT is a hot technology worldwide, cutting across agriculture, space, healthcare, manufacturing, construction, water and mining, with applications such as innovative shopping systems, infrastructure management, remote health monitoring, emergency notification and transportation systems. By the end you should be able to: understand the concepts of the Internet of Things; understand what constitutes an IoT design solution; identify the sensors and other devices needed for different IoT solutions; understand the component parts of an IoT network and its connections; and build small IoT applications.

Unit-Wise Complete Topic List

Unit 1 — Introduction to Internet of Things (10 Periods)

Topics: Introduction to IoT; defining IoT; things in IoT; characteristics of IoT; physical design of IoT; logical design of IoT; functional blocks of IoT; IoT protocols; IoT communication models; IoT communication APIs; IoT enabling technologies.

In simple words: What IoT really means, what its building blocks are, and how things talk to each other and to the internet.

Unit 2 — IoT Devices (12 Periods)

Topics: How electronic devices fit with the Internet of Things and why they are important: breadboard and its internal connections; LED and its connections; tri-colour LED; resistor; introduction to end devices, sensors and actuators; differentiating between different sensor types.

In simple words: The hands-on electronics foundation: breadboards, LEDs, resistors, and the sensors and actuators that let a device sense and affect the real world.

Unit 3 — IoT Networks (12 Periods)

Topics: Introduction to the components of basic IoT networks; types of network connections and how data travels through them; the role of internet protocols; understanding of microcontrollers/Arduino and communication protocols.

In simple words: How IoT devices connect and send data — network types, internet protocols, and the microcontroller at the centre of it all.

Unit 4 — Arduino (12 Periods)

Topics: Features of Arduino device; Arduino device introduction; components of Arduino board; C Arduino programming language; understanding basics of Arduino IDE; functions; control statements; loops; data types; variables.

In simple words: Meet Arduino: the board, its parts, its programming environment, and the C-style code that makes it do things.

Unit 5 — IoT and M2M (10 Periods)

Topics: Introduction; M2M; difference between IoT and M2M; SDN and NFV for IoT — software defined networking, network function virtualisation; IoT and WoT (Web of Things).

In simple words: How IoT differs from the older machine-to-machine idea, and the newer networking ideas (SDN, NFV) and the Web of Things that sit behind large IoT systems.

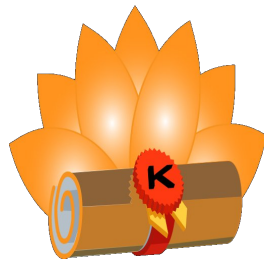
Practical Work

- Installation of Arduino IDE.
- Interfacing Light Emitting Diode (LED) — blinking LED.
- Interfacing button and LED — LED blinking when the button is pressed.
- Interfacing Light Dependent Resistor (LDR) and LED — displaying an automatic night lamp.
- Interfacing temperature sensor (LM35) and/or humidity sensor (e.g. DHT11).
- Interfacing Liquid Crystal Display (LCD) — display data generated by a sensor on the LCD.
- Interfacing Air Quality Sensor — pollution (e.g. MQ135) — display data on LCD, switch on LED when the sensed data is higher than a specified value.
- Interfacing Bluetooth module (e.g. HC05) — receiving data from a mobile phone on Arduino and displaying it on the LCD.
- Interfacing Relay module to demonstrate a Bluetooth-based home automation application (using Bluetooth and relay).

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Mobile App Development — Complete Syllabus (Program Elective-2, Option 1)

BTEUP Diploma in Computer Science & Engineering • 5th Semester • Session 2026-27
Subject 5.3.1 (Practicum) • Total 100 Marks • 5 Credits • L 3 – P 4 • Choose this OR
Multimedia Technologies

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
5.3	Program Elective-2: Mobile App Development	Practicum	3 - 4	5	40	Theory 60 (3 hrs)	100
Mobile App Development Total				5	40	60	100

What This Subject Aims To Do

To facilitate understanding of the Android SDK, to give a basic understanding of Android application development, and to inculcate working knowledge of the Android Studio development tool. By the end you should be able to: identify the concepts of mobile programming that make it unique from programming for other platforms; critique mobile applications on their design pros and cons; use rapid prototyping techniques to design and develop sophisticated mobile interfaces; program mobile applications for the Android operating system that use basic and advanced phone features; and deploy applications to the Android marketplace for distribution.

Unit-Wise Complete Topic List

Unit I — Introduction to Android

Topics: The Android platform; Android SDK; Eclipse installation; Android installation; building your first Android application; understanding the anatomy of an Android application; Android manifest file.

In simple words: Setting up for Android development and building your very first app, while learning what an app is made of inside.

Unit II — Android Application Design Essentials

Topics: Anatomy of an Android application; Android terminologies; application context; activities; services; intents; receiving and broadcasting intents; Android manifest file and its common settings; using intent filters; permissions.

In simple words: The core moving parts of an app: screens (activities), background work (services), and messages between parts of the system (intents), plus permissions.

Unit III — Android User Interface Design Essentials

Topics: User interface screen elements; designing user interfaces with layouts; drawing and working with animation.

In simple words: How to design screens people enjoy using: layouts, interface elements and animation.

Unit IV — Testing and Publishing

Topics: Testing Android applications; publishing Android applications; using Android preferences; managing application resources in a hierarchy; working with different types of resources.

In simple words: Making sure an app works properly, then getting it ready for real users — including settings (preferences) and resources.

Unit V — Using Common Android APIs

Topics: Using Android data and storage APIs; managing data using SQLite; sharing data between applications with content providers; using Android networking APIs; using Android web APIs; using Android telephony APIs; deploying an Android application to the world.

In simple words: The powerful built-in features: storing data, sharing data between apps, using the internet and phone features, and finally deploying your app.

Reference Books (as listed in the syllabus)

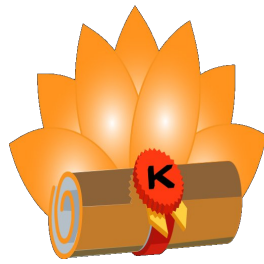
- Professional Android 2 Application Development — Reto Meier, Wiley India
- Beginning Android — Mark L. Murphy, Wiley India
- Android Application Development All-in-One For Dummies — Barry Burd

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Multimedia Technologies — Complete Syllabus (Program Elective-2, Option 2)

BTEUP Diploma in Computer Science & Engineering • 5th Semester • Session 2026-27
Subject 5.3.2 (Practicum) • Total 100 Marks • 5 Credits • L 3 - P 4 • Choose this OR
Mobile App Development

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
5.3	Program Elective-2: Multimedia Technologies	Practicum	3 - 4	5	40	Theory 60 (3 hrs)	100
Multimedia Technologies Total				5	40	60	100

What This Subject Aims To Do

To introduce students to the domain of multimedia technologies, explaining the technologies underlying digital images, videos and audio content, including various compression techniques and standards, and the issues involved in delivering multimedia content over the internet. By the end you should be able to: understand various aspects of multimedia and related standards; build multimedia content and applications; and multimedia-enable web applications and mobile applications.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
1	Introduction to Multimedia	10	25%

2	Basic Compression Techniques	12	25%
3	Content Development and Distribution	10	25%
4	Introduction to Digital Imaging	10	25%

Unit 1 — Introduction to Multimedia (10 Periods, 25%)

Topics: Multimedia foundation and concepts: multimedia hardware; multimedia software; multimedia operating systems; multimedia communication systems.

In simple words: What multimedia is made of: the hardware, software and systems that handle text, images, audio and video together.

Unit 2 — Basic Compression Techniques (12 Periods, 25%)

Topics: Video and audio data compression techniques — lossy and lossless; example algorithms/standards: Huffman, RLE, JPEG, MPEG, MP3, MP4, LZMA, FLAC, ALAC, ITU G. 722, H.261, H.265.

In simple words: Why a video file is not impossibly huge: compression — throwing away what you will not notice (lossy) vs keeping everything exactly (lossless) — and the famous formats behind MP3, JPEG and video.

Unit 3 — Content Development and Distribution (10 Periods, 25%)

Topics: Desktop publishing (CorelDRAW, Photoshop, PageMaker); multimedia animation and special effects (2D/3D animation, Flash).

In simple words: Making the content itself: desktop publishing tools for print and graphics, and animation for moving content.

Unit 4 — Introduction to Digital Imaging (10 Periods, 25%)

Topics: Basics of graphic design and use of digital technology; definition of digital images; digital imaging in multimedia.

In simple words: What a digital image actually is, and how graphic design works with digital technology.

Practical Work

- Installation of various multimedia software like Photoshop/GIMP, Blender, Flash, Director or any open-source software.
- Installing and using various multimedia devices: scanner, digital camera, web camera, microphone and speakers, touch screen, plotter and printers, DVD, audio CD and video CD.

- Reading and writing different formats on CD/DVD.
- Transporting audio and video files.
- Using various features of Flash.
- Using various features of Photoshop/GIMP.
- Using various features of Blender.
- Making multimedia presentations combining Flash and Photoshop/GIMP, such as a department profile, lesson presentation, games and project presentations.

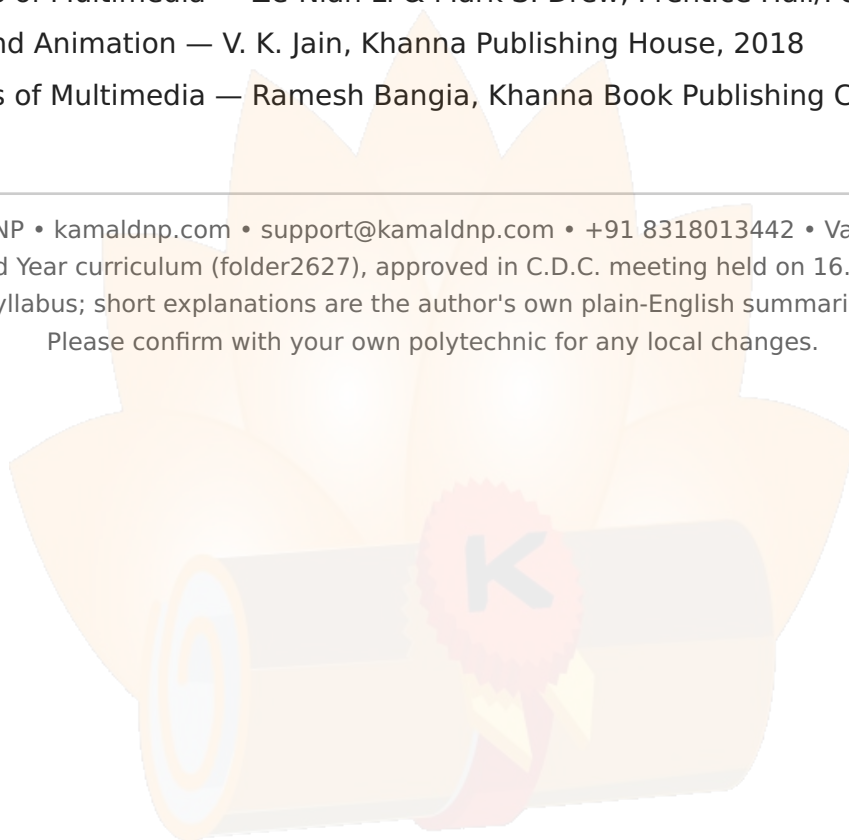
Reference Books (as listed in the syllabus)

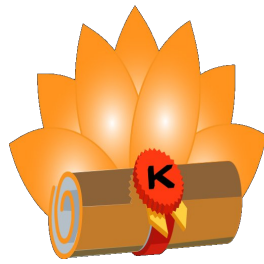
- An Introduction to Multimedia Authoring — A. Eliens
- Fundamentals of Multimedia — Ze-Nian Li & Mark S. Drew, Prentice Hall/Pearson
- Multimedia and Animation — V. K. Jain, Khanna Publishing House, 2018
- Fundamentals of Multimedia — Ramesh Bangia, Khanna Book Publishing Co., New Delhi (2007)

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Information Security — Complete Syllabus (Program Elective-3, Option 1)

BTEUP Diploma in Computer Science & Engineering • 5th Semester • Session 2026-27
Subject 5.4.1 (Practicum) • Total 100 Marks • 5 Credits • L 3 - P 4 • Choose this OR
Advance Computer Networks

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
5.4	Program Elective-3: Information Security	Practicum	3 - 4	5	40	Theory 60 (3 hrs)	100
Information Security Total				5	40	60	100

What This Subject Aims To Do

To learn how to evaluate and enhance the information security of IT infrastructure and organisations. By the end you should be able to: understand the security needs and issues of IT infrastructure, and apply basic skills in security audit of networks, operating systems and application software.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
1	Introduction to Information Security	8	20%
2	Security Weaknesses in Networks	10	22%

3	Cryptography and Secure Development	8	20%
4	Network Security Products	8	20%
5	Security Standards, Audit and Policy	8	18%

Unit 1 — Introduction to Information Security (8 Periods, 20%)

Topics: Introduction to information security; various aspects of information security (PAIN); security features of operating systems — authentication, logs, audit features, file system protection, user privileges, RAID options, anti-virus software, etc.

In simple words: Why security matters, and the protections already built into operating systems — passwords, logs, permissions and anti-virus.

Unit 2 — Security Weaknesses in Networks (10 Periods, 22%)

Topics: Understanding security weaknesses in popular networking protocols — IP, TCP, UDP, RIP, OSPF, HTTP, SMTP, etc.; security weaknesses in common networking devices — hub, switch, router, WiFi; security solutions to mitigate security risk of networking protocols (IPSec, HTTPS, etc.) and devices (VLAN, VPN, ingress filtering, etc.).

In simple words: Where networks are weak — in their protocols and their boxes — and the standard fixes that protect them.

Unit 3 — Cryptography and Secure Development (8 Periods, 20%)

Topics: Basics of cryptography; PKI; security considerations while developing software.

In simple words: Secret writing done properly: encryption, public-key infrastructure (how secure websites prove who they are), and writing software that does not open holes for attackers.

Unit 4 — Network Security Products (8 Periods, 20%)

Topics: Network security products — firewall, IDS/IPS, VPN concentrator, content screening gateways, etc.

In simple words: The security appliances that guard a network: firewalls, intrusion detection/prevention systems, VPN concentrators and content filters.

Unit 5 — Security Standards, Audit and Policy (8 Periods, 18%)

Topics: Introduction to security standards — ISO 27001, Indian IT Act, IPR laws; security audit procedures; developing security policies; disaster recovery; business continuity planning.

In simple words: The rules of the profession: international standards, Indian law, how to audit a system, how to write a security policy, and how an organisation recovers after a disaster.

Practical Work

- Study the security provided within the Windows operating system.
- Recover the password of Windows machines using a password recovery utility (John the Ripper) or any other utility.
- Trace the origin of an email using an email trace tool.
- Use of keylogger and anti-keylogger to secure your system.
- Encrypt and decrypt a message using simple transposition — permutation (CrypTool).
- Encrypt and decrypt a message using Caesar Cipher with variable key (CrypTool); encrypt and decrypt a message using a 3×3 Hill Cipher (CrypTool).
- Create a digital signature document using CrypTool.
- Send and receive a secret message using steganography techniques using Steghide.

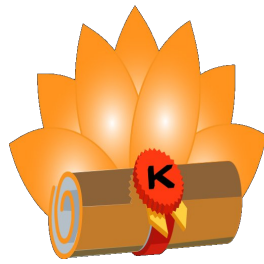
Reference Books (as listed in the syllabus)

- Information Security and Cyber Laws — Sarika Gupta, Khanna Publishing House
- RFCs of the protocols listed in the content (ietf.org)
- Various Acts, Laws and Standards (IT Act, ISO 27001 Standard, IPR and Copyright Laws, etc.)
- Security guideline documents of operating systems (OS manuals, man pages, etc.)
- cert-in.org.in
- sans.org

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Advance Computer Networks — Complete Syllabus (Program Elective-3, Option 2)

BTEUP Diploma in Computer Science & Engineering • 5th Semester • Session 2026-27
Subject 5.4.2 (Practicum) • Total 100 Marks • 5 Credits • L 3 – P 4 • Choose this OR Information Security

Examination Scheme

Code	Paper	Type	L – P	Credits	Internal	External	Total
5.4	Program Elective-3: Advance Computer Networks	Practicum	3 – 4	5	40	Theory 60 (3 hrs)	100
Advance Computer Networks Total				5	40	60	100

What This Subject Aims To Do

An understanding of the overriding principles of computer networking, including protocol design, protocol layering, algorithm design and performance evaluation.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
1	Review of Networking Basics	10	—
2	Telecom Networks, Switching Techniques	10	—

3	QoS	6	—
4	Introduction to Network Security	8	—
5	Network Simulation	8	—

Unit 1 — Review of Networking Basics (10 Periods)

Topics: Advanced topics in IPv4 — subnetting, multicasting, multicast routing protocols (IGMP, PIM, DVMRP); advanced topics in TCP — flow management, congestion avoidance, protocol spoofing; IPv6.

In simple words: Going deeper on the basics: splitting networks into subnets, sending one stream to many receivers, controlling TCP traffic jams, and IPv6.

Unit 2 — Telecom Networks, Switching Techniques (10 Periods)

Topics: Introduction to Frame Relay, ATM, MPLS; VSAT communication — star and mesh architectures, bandwidth reservation; wireless networks — WiFi, WiMax; cellular phone technologies — GSM, CDMA, 3G, 4G.

In simple words: How telecom networks actually carry data: older switching technologies, satellite links, wireless broadband, and the mobile generations from GSM to 4G.

Unit 3 — QoS (6 Periods)

Topics: Network redundancy; load balancers; caching; storage networks; QoS; network monitoring — SNMP, RMON.

In simple words: Quality of Service: making sure important traffic (like voice and video) is not delayed, and watching the network to prove it.

Unit 4 — Introduction to Network Security (8 Periods)

Topics: VLAN, VPN, firewall, IPS, proxy servers.

In simple words: Separating and protecting networks: virtual LANs, virtual private networks, firewalls, intrusion prevention and proxies.

Unit 5 — Network Simulation (8 Periods)

Topics: Network simulation; network design case studies and exercises; IP addressing schema; protocol analysers (Wireshark, etc.).

In simple words: Putting it all together in simulation: designing networks on paper and in tools, planning IP addresses, and analysing real traffic with Wireshark.

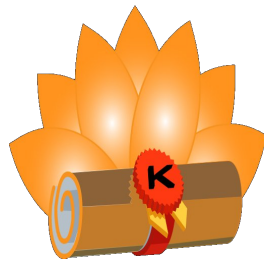
Practical Work

- Study different types of network cables and implement cross-wired and straight-through cables using clamping tools.
- From given data, find subnet, broadcast, range and subnet bits.
- Study various basic network commands and network configuration commands.
- Perform an initial router configuration.
- Interpret ping and trace-route output.
- Connect the computers in a Local Area Network.
- Perform logical troubleshooting.
- Observe static and dynamic routing.
- Configure the router as a DHCP server.
- Perform various networking operations using Packet Tracer.

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Source: BTEUP 3rd Year curriculum (folder2627), approved in C.D.C. meeting held on 16.07.2026. Topic lists follow the official syllabus; short explanations are the author's own plain-English summaries, not syllabus text.

Please confirm with your own polytechnic for any local changes.



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Open Elective-2 & Advance Skill Development — 5th Semester

BTEUP Diploma in Computer Science & Engineering • 5th Semester • Session 2026-27
Subject 5.5 (Qualifying) • Theory L 2 • 2 Credits • 50 Marks (Qualifying)

Qualifying subject: You must appear in the examination and pass it, but the marks are NOT counted in your percentage or division. That is why this subject is excluded from the 5th semester total of 550 marks.

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
5.5	(Q) Open Elective-2 OR Advance Skill Development	Theory	2 - 0	2	50*	—	50*
Open Elective-2 Total (Qualifying)				2	50*	—	50*

Your Three Options — Pick One

- **Product Design** (2 - 0 - 0, 2 credits)
- **Engineering Economics & Accountancy** (2 - 0 - 0, 2 credits)
- **Artificial Intelligence and Machine Learning (TATA)** (2 - 0 - 0, 2 credits)

Not every option is available at every polytechnic — your institute offers the ones it can run, so confirm availability there first.

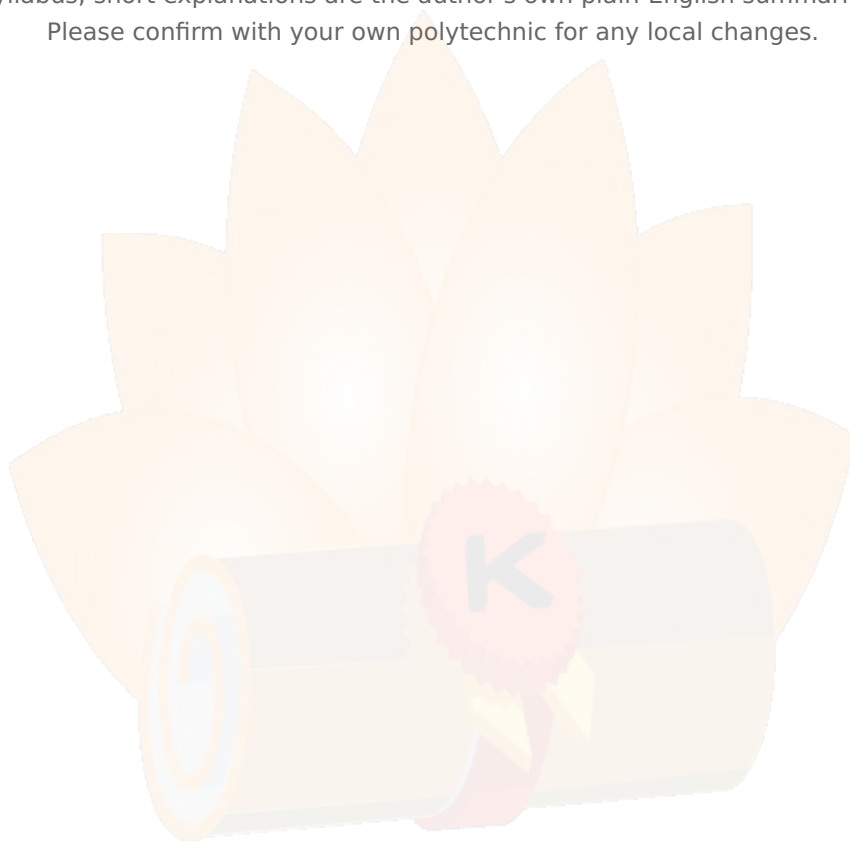
OR: Advance Skill Development Certification Course

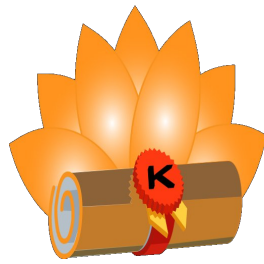
Instead of an open elective, you may take an Advance Skill Development course: a certification course of not less than 20 hours, conducted by a recognised agency or institute. Options include courses conducted by Centres of Excellence (established by third parties such as TATA Technologies), Infosys Springboard, TCS iON, other relevant government / international / national organisations or platforms of repute, AICTE-ELIS and centrally funded technical institutes, C-DAC, and NIELIT. You must present the certificate to earn the credits for this subject.

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Summer Internship-II, Indian Constitution & SCA — 5th Semester

BTEUP Diploma in Computer Science & Engineering • 5th Semester • Session 2026-27
Subject 5.6 (Internship) 100 Marks • 5.7 (Qualifying) 50 Marks • SCA 50 Marks

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
5.6	Summer Internship-II (6 Weeks)	Internship	—	2	60	40 (3 hrs)	100
5.7	(Q) Indian Constitution	Audit	2 - 0	—	50*	—	50*
—	Student Centred Activities (SCA)	Activity	—	—	50	—	50
Internship-II + SCA (excluding Qualifying)				2	110	40	150

Summer Internship-II — 6 Weeks (100 Marks)

Six weeks of industrial training after the 4th semester examinations, evaluated in the 5th semester. Internal assessment 60 marks, external assessment 40 marks. Students submit the certificate and present a seminar/viva on their summer internship, along with the project and report.

Indian Constitution — Qualifying (50 Marks)

An audit-type qualifying subject: you must appear and pass, but the marks are not included in your percentage or division of obtained marks.

Student Centred Activities (SCA) — 50 Marks

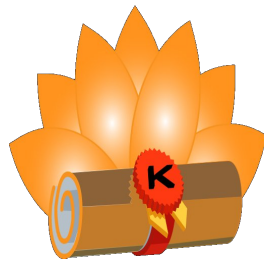
Co-curricular activities such as extension lectures, games, hobby clubs (for example photography), seminars, declamation contests, educational field visits, NCC, NSS, library work, cultural activities and self-study. The periods allotted to SCA can also be utilised to complete the syllabus for other subjects.

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Program Elective-4 — Complete Syllabus

BTEUP Diploma in Computer Science & Engineering • 6th Semester • Session 2026-27
Subject 6.1 (Program Elective-4) • Total 100 Marks • 4 Credits • L 4 • Choose ONE of
6.1.1 / 6.1.2

About this document: Program Elective-4 is a theory elective worth 4 credits and 100 marks. Students choose **ONE** of the two options below — 6.1.1 Fundamentals of Artificial Intelligence or 6.1.2 Data Science and Machine Learning — and are examined only in the option they choose. Both options are covered here, completely, in the official order.

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
6.1	Program Elective-4 (choose ONE of 6.1.1 / 6.1.2)	Theory	4 - 0	4	Theory 40	Theory 60 (3 hrs)	100
Program Elective-4 Total				4	40	60	100

What This Subject Aims To Do

To let students specialise in one of two directions — artificial intelligence, or data science and machine learning — through a single 4-credit theory elective examined for 100 marks.

Option 6.1.1 — Fundamentals of Artificial Intelligence

Course Objectives: Identify problems where artificial intelligence techniques are applicable; apply selected basic AI techniques; judge applicability of more advanced techniques; participate in the design of systems that act intelligently and learn from experience.

Course Outcomes

- CO1: Understanding the basic concepts of Artificial Intelligence.
- CO2: Describing different AI searching algorithms.
- CO3: Applying various optimization techniques to real world problems.
- CO4: Capable of implementing autonomous planning under constraints in simulated or real environment.
- CO5: Applying different AI logics to solve various problems.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
1	Introduction	8	20%
2	Searching	8	20%
3	Finding Optimal Paths, Problem Decomposition and Game Playing	10	20%
4	Planning and Constraint Satisfaction	8	20%
5	Logic and Inferences	8	20%

Unit 1 — Introduction (8 Periods, 20%)

Topics: Overview and Historical Perspective, Turing test, Physical Symbol Systems and the scope of Symbolic AI, Agents.

Unit 2 — Searching (8 Periods, 20%)

Topics: Heuristic Search: Best First Search, Hill Climbing, Beam Search, Tabu Search. Randomized Search: Simulated Annealing, Genetic Algorithms, Ant Colony Optimization.

Unit 3 — Finding Optimal Paths, Problem Decomposition and Game Playing (10 Periods, 20%)

Topics: Finding Optimal Paths: Branch and Bound, A*, IDA*, Divide and Conquer approaches, Beam Stack Search. Problem Decomposition: Goal Trees, AO*, Rule Based Systems, Rete Net. Game Playing: Minimax Algorithm, Alpha-Beta Algorithm, SSS*.

Unit 4 — Planning and Constraint Satisfaction (8 Periods, 20%)

Topics: Domains, Forward and Backward Search, Goal Stack Planning, Plan Space Planning, Graphplan, Constraint Propagation.

Unit 5 — Logic and Inferences (8 Periods, 20%)

Topics: Propositional Logic, First Order Logic, Soundness and Completeness, Forward and Backward chaining.

Practical Work: No practicals listed in the official syllabus for this option.

Reference Books (as listed in the syllabus)

- Deepak Khemani. A First Course in Artificial Intelligence, McGraw Hill Education (India).
- <https://nptel.ac.in/courses/106106126/>
- Stefan Edelkamp and Stefan Schroedl. Heuristic Search, Morgan Kaufmann.
- Pamela McCorduck, Machines Who Think: A Personal Inquiry into the History and Prospects of Artificial Intelligence, A K Peters/CRC Press.
- Elaine Rich and Kevin Knight. Artificial Intelligence, Tata McGraw Hill.
- Stuart Russell and Peter Norvig. Artificial Intelligence: A Modern Approach, Prentice Hall.
- M.C. Trivedi, A classical approach to Artificial Intelligence, Khanna Publishing House.

Option 6.1.2 — Data Science and Machine Learning

Course Objectives: This course will introduce the concepts of data warehouse and data mining, which gives a complete description about the principles, used, architectures, applications, design and implementation of data mining and data warehousing concepts.

Course Outcomes

- CO 1: Understand the basics of Data Science.
- CO 2: Visualize and Analyze Data.
- CO 3: Understand concept of Exploratory Data Analysis.
- CO 4: Understand and develop Machine Learning Algorithms.
- CO 5: Implement Mining Process on Social Network Graph.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
1	Introduction of Data Science and Machine Learning	10	22%

2	Data Preprocessing, Analysis and Visualization	6	16%
3	Statistical Inference & Exploratory Data Analysis and the Data Science Process	10	22%
4	Machine Learning Algorithms	8	20%
5	Mining Social-Network Graphs, Data Science and Ethical Issues	8	20%

Unit 1 — Introduction of Data Science and Machine Learning (10 Periods, 22%)

Topics: Fundamentals of Artificial Intelligence, need and applications of Data Science, Data Mining, data preparation, Machine Learning, Types and Applications of Machine Learning.

Unit 2 — Data Preprocessing, Analysis and Visualization (6 Periods, 16%)

Topics: Data Pre-processing: Pre-processing Techniques — Mean Removal, Scaling, Normalization, Binarization, One Hot Encoding, Label encoding. Data Analyses: Loading and summarizing the dataset. Data Visualization: Univariate Plots, Multivariate Plots, Training Data, Test Data, Performance Measures.

Unit 3 — Statistical Inference & Exploratory Data Analysis and the Data Science Process (10 Periods, 22%)

Topics: Populations and samples, Types of Statistical modelling, Types of probability distributions, Parametric and Non-Parametric Methods, Distance Metrics. Basic tools (plots, graphs and summary statistics) of EDA, Philosophy of EDA, The Data Science Process.

Unit 4 — Machine Learning Algorithms (8 Periods, 20%)

Topics: Introduction to Supervised Learning Algorithms — Decision Tree, Linear Regression, k Nearest Neighbours (k-NN), SVM — and Introduction to Unsupervised Learning Algorithms — K-means Clustering, Mean Shift Algorithm, Dimensionality Reduction Techniques, Introduction to Neural Networks.

Unit 5 — Mining Social-Network Graphs, Data Science and Ethical Issues (8 Periods, 20%)

Topics: Social networks as graphs, Clustering of graphs, Direct discovery of communities in graphs, Partitioning of graphs, Neighbourhood properties in graphs, Discussions on privacy, security, ethics, A look back at Data Science, Next-generation data scientists.

Practical Work: No practicals listed in the official syllabus for this option.

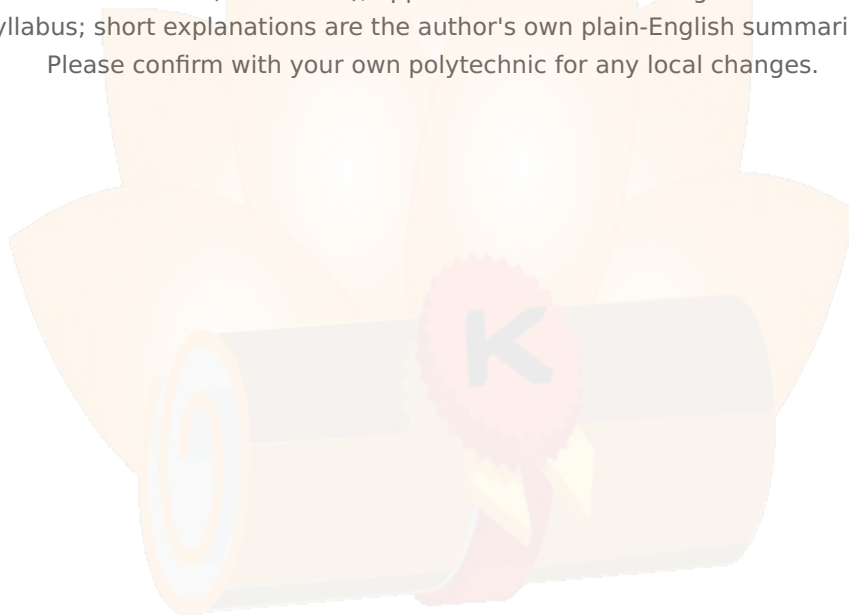
Reference Books (as listed in the syllabus)

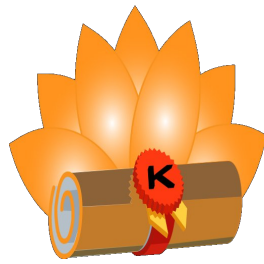
- Jiawei Han, Micheline Kamber, Jian Pei, Data Mining: Concepts and Techniques, Elsevier.
- Margaret H Dunham, Data Mining Introductory and Advanced Topics, Pearson Education.
- Amitesh Sinha, Data Warehousing, Thomson Learning, India.
- Xingdong Wu, Vipin Kumar, the Top Ten Algorithms in Data Mining, CRC Press, UK.

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Entrepreneurship and Start-ups — Complete Syllabus

BTEUP Diploma in Computer Science & Engineering • 6th Semester • Session 2026-27
Subject 6.2 (Humanities — Theory) • Total 100 Marks • 2 Credits • L 2

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
6.2	Entrepreneurship and Start-ups	Theory (Humanities)	2 - 0	2	Theory 40	Theory 60 (3 hrs)	100
Entrepreneurship and Start-ups Total				2	40	60	100

What This Subject Aims To Do

Explore the objectives of Entrepreneurship, including innovation, wealth creation, and societal impact, and learn how entrepreneurs foster economic growth. Entrepreneurship drives the economy and is fundamental to all innovation and development.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
1	Introduction to Entrepreneurship and Start-Ups	2	17%
2	Business Ideas and their implementation	6	14%

3	Ideas to Start-up	6	20%
4	Management	4	17%
5	Financing and Protection of Ideas	6	21%
6	Succession, Dissolution and Harvesting strategy	4	11%

Unit 1 — Introduction to Entrepreneurship and Start-Ups (2 Periods, 17%)

Topics: Definitions, Classification of Entrepreneur; Traits of an Entrepreneur, Intrapreneurship, Motivation; Types of Business Structures — on the basis of size and on the basis of ownership; Similarities/differences between entrepreneurs and managers.

Unit 2 — Business Ideas and their implementation (6 Periods, 14%)

Topics: Discovering ideas and visualizing the business; Activity map; Business Plan (Case Study).

Unit 3 — Ideas to Start-up (6 Periods, 20%)

Topics: Marketing and Accounting — Definition and Importance; Market Analysis — STP (Segmentation, Targeting, Positioning); Competition evaluation and Strategy Development — Vision, Mission, Goal, Objectives; Risk analysis — SWOT Analysis.

Unit 4 — Management (4 Periods, 17%)

Topics: Definition, Concept and Functions of Management; Company's Organization Structure — Concept and Classification; Recruitment and Selection — Definition; Training and Development — Importance.

Unit 5 — Financing and Protection of Ideas (6 Periods, 21%)

Topics: Financing methods available for Entrepreneurship / Startups in India (Government Scheme, Banking, NBFCs, SHG and Micro Financing); Intellectual Property Rights — Overview of Copyrights, Trademark, Geographical Indicators, Patenting and Licenses; Communication of Ideas to potential investors — Investor Pitch.

Unit 6 — Succession, Dissolution and Harvesting strategy (4 Periods, 11%)

Topics: Ways of succession; Types of Dissolution.

Course Outcomes

- CO 1: Understand the basic of Entrepreneurship and Business Structures.
- CO 2: Planning and implementation of Business ideas.
- CO 3: Understanding Strategical Market Analysis.
- CO 4: Manage Organizational roles.
- CO 5: Understanding various Financial schemes.

Suggested Software / Learning Websites

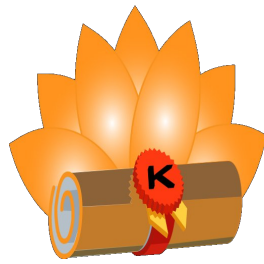
- <https://www.fundable.com/learn/resources/guides/startup>
- <https://corporatefinanceinstitute.com/resources/knowledge/finance/corporate-structure/>
- <https://www.finder.com/small-business-finance-tips>
- <https://www.profitbooks.net/funding-options-to-raise-startup-capital-for-your-business/>
- NPTEL Course on Entrepreneurship — https://onlinecourses.nptel.ac.in/noc23_mg74/ preview
- National Geographic Channel YouTube video on “GI Tag Crafts of Bharat”

Reference Books (as listed in the syllabus)

- The Startup Owner's Manual: The Step-by-Step Guide for Building a Great Company — Steve Blank and Bob Dorf, K & S Ranch, ISBN 978-0984999392.
- Entrepreneurship Development (A new Venture creation) — Vasant Desai, Himalaya Publication.
- Entrepreneurship Development — Khanka S.S., S Chand & Company Limited, New Delhi.
- Entrepreneurship Development — Gupta and Srinivasan, S Chand & Company Limited, New Delhi.
- Demand: Creating What People Love Before They Know They Want It — Adrian J. Slywotzky with Karl Weber, Headline Book Publishing, ISBN 978-0755388974.
- The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses — Eric Ries, Penguin UK, ISBN 978-0670921607.
- The Innovator's Dilemma: The Revolutionary Book That Will Change the Way You Do Business — Clayton M. Christensen, Harvard Business Review Press, ISBN 978-142219602.

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In House Project — Complete Syllabus

BTEUP Diploma in Computer Science & Engineering • 6th Semester • Session 2026-27
Subject 6.3 (Project) • Total 400 Marks • 12 Credits • L 4 – P 16

Note: The official syllabus gives no unit-wise topics, no practical list and no reference books for the In House Project — the project is defined by the assignment the student chooses, not by fixed units. The 6th-semester Normal Pathway totals 650 marks: 6.1 (100) + 6.2 (100) + 6.3 (400) + SCA (50). Subject 6.4 is qualifying only and its 50 marks are not counted in that total.

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
6.3	In House Project	Project	4 - 16	12	Internal 240	Practical 160	400
In House Project Total				12	240	160	400

What This Subject Aims To Do

In House Project Work aims at developing innovative skills in the students whereby they apply in totality the knowledge and skills gained through the course work in the solution of a particular problem or by undertaking a project.

How the Project Works

The individual students have different aptitudes and strengths. Project work, therefore, should match the strengths of students. For this purpose, students should be asked to identify the type of project work they would like to execute. It is also essential that the faculty of the respective department may have a brainstorming to identify suitable project assignments for

their students. The project assignment can be an individual assignment or a group assignment. There should not be more than 3 students if the project work is given to a group. The students should identify themselves or accept the given project assignment at least two to three months in advance. The project work identified in collaboration with industry should be preferred. Each teacher is expected to guide the project work of 5–6 students.

Project Assignment Types

- Programming customer based applications
- Web page designing (Only dynamic)
- Database applications
- Software Development

Learning Outcomes

After undergoing this subject, the student will be able to:

- Use effectively oral, written and visual communication.
- Demonstrate skill and knowledge of current information and technological tools and techniques specific to the professional field of study.
- Identify, analyze and solve problems creatively through sustainment critical investigation.
- Develop leadership abilities.
- Apply fundamental and disciplinary concepts and methods in ways appropriate to their areas of study.

Practical Work and Reference Books

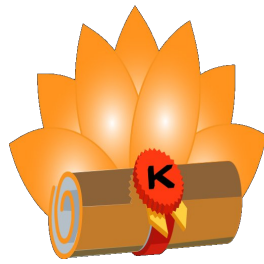
No separate practical list or reference books are given in the official syllabus for the In House Project.

Alternative — the Industrial Pathway

Instead of the Normal Pathway, a student may take the **Industrial Pathway** (also 650 marks): 6.1 Entrepreneurship and Start-ups (Online) — 100 marks; 6.2 Industrial Hands On Practice — 350 marks (150 by faculty mentor + 200 by industry); 6.3 Industrial Project — 100 marks (50 by faculty mentor + 50 by industry); 6.4 Seminar — 100 marks. The industrial training tenure should not be less than 14 weeks, the industry must be registered with MSME / Directorate of Industries / a Limited Organisation / State or Central Government establishments, and monthly progress reports of the intern/trainee should be attested and forwarded by the industrial supervisor during the internship/training.

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Open Elective-3 — Complete Syllabus

BTEUP Diploma in Computer Science & Engineering • 6th Semester • Session 2026-27
Subject 6.4 (Q) (Open Elective-3) • 50 Marks Internal Only • 2 Credits • L 2 • Qualifying —
marks NOT counted in percentage / division • Choose ONE of 6.4.1 / 6.4.2 OR Advance
Skill Development

About this document: Open Elective-3 is a qualifying (Q) theory elective worth 2 credits. Students choose **ONE** of the two options below — 6.4.1 Disaster Management or 6.4.2 Renewable Energy Technologies — or take an **Advance Skill Development** certification course instead (duration not less than 20 hours, offline/online, chosen from the elective list provided in the syllabus and conducted by agencies of repute). It is compulsory to appear and to pass the examination, but the 50 internal marks will **not** be included for percentage and division of obtained marks. Both options are covered here, completely, in the official order.

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
6.4	Open Elective-3 (choose ONE of 6.4.1 / 6.4.2) OR Advance Skill Development	Theory	2 - 0	2	50	—	— (Q)
Open Elective-3 Total				2	50	—	— (Q)

What This Subject Aims To Do

To let students take one qualifying open elective — disaster management or renewable energy technologies — or an Advance Skill Development certification course in its place, with 50 internal marks that do not count towards the semester percentage or division.

Option 6.4.1 — Disaster Management

Course Objectives: Disaster management aims to reduce, or avoid the potential losses from hazards, assure prompt and appropriate assistance to victims of disaster, and achieve rapid and effective recovery.

Course Outcomes

- CO 1: Understanding disaster and hazards.
- CO 2: Understanding types, consequences and control of disasters.
- CO 3: Understanding Disaster Management Cycle.
- CO 4: Understanding Disaster Management Acts in India.
- CO 5: Understanding application of technology for Managing the disasters.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
I	Understanding Disaster	6	17%
II	Types, Trends, Causes, Consequences and Control of Disasters	10	22%
III	Disaster Management Cycle and Framework	10	22%
IV	Disaster Management in India	10	22%
V	Applications of Science and Technology for Disaster Management	6	17%

Unit I — Understanding Disaster (6 Periods, 17%)

Topics: Understanding the concepts and definitions of Disaster, Hazard, Vulnerability, Risk, Capacity, Disaster and Development, and disaster management.

Unit II — Types, Trends, Causes, Consequences and Control of Disasters (10 Periods, 22%)

Topics: Geological Disasters (earthquakes, landslides, tsunami, mining); Hydro-Meteorological Disasters (floods, cyclones, lightning, thunder-storms, hail storms, avalanches, droughts, cold and heat waves); Biological Disasters (epidemics, pest attacks, forest fire); Technological Disasters (chemical, industrial, radiological, nuclear) and Manmade Disasters (building collapse, rural and urban fire, road and rail accidents, nuclear, radiological, chemicals and biological disasters); Global Disaster Trends — Emerging Risks of Disasters — Climate Change and Urban Disasters.

Unit III — Disaster Management Cycle and Framework (10 Periods, 22%)

Topics: Disaster Management Cycle — Paradigm Shift in Disaster Management. Pre-Disaster — Risk Assessment and Analysis, Risk Mapping, zonation and Micro zonation, Prevention and Mitigation of Disasters, Early Warning System; Preparedness, Capacity Development; Awareness. During Disaster — Evacuation — Disaster Communication — Search and Rescue — Emergency Operation Centre — Incident Command System — Relief and Rehabilitation. Post-disaster — Damage and Needs Assessment, Restoration of Critical Infrastructure — Early Recovery — Reconstruction and Redevelopment; IDNDR, Yokohama Strategy, Hyogo Framework of Action.

Unit IV — Disaster Management in India (10 Periods, 22%)

Topics: Disaster Profile of India — Mega Disasters of India and Lessons Learnt. Disaster Management Act 2005 — Institutional and Financial Mechanism, National Policy on Disaster Management, National Guidelines and Plans on Disaster Management; Role of Government (local, state and national), Non-Government and Inter Governmental Agencies.

Unit V — Applications of Science and Technology for Disaster Management (6 Periods, 17%)

Topics: Geo-informatics in Disaster Management (RS, GIS, GPS and RS). Disaster Communication System (Early Warning and Its Dissemination). Land Use Planning and Development Regulations, Disaster Safe Designs and Constructions, Structural and Non-Structural Mitigation of Disasters; S&T Institutions for Disaster Management in India.

Practical Work: No practicals listed in the official syllabus for this option.

Reference Books (as listed in the syllabus)

- Publications of National Disaster Management Authority (NDMA) on Various Templates and Guidelines for Disaster Management.
- Bhandani, R. K., An overview on natural & man-made disasters and their reduction, CSIR, New Delhi.
- Srivastava, H. N., and Gupta G. D., Management of Natural Disasters in developing countries, Daya Publishers, Delhi.
- Alexander, David, Natural Disasters, Kluwer Academic London.
- Ghosh, G. K., Disaster Management, A P H Publishing Corporation.
- Murthy, D. B. N., Disaster Management: Text & Case Studies, Deep & Deep Pvt. Ltd.

Option 6.4.2 — Renewable Energy Technologies

The source lists no period counts or marks distribution for this option, and no course objectives — only course outcomes. Unit heads below therefore carry no periods or weightage.

Course Outcomes

- CO 1: Understanding basics of Renewable Energy.
- CO 2: Understanding Solar Energy.
- CO 3: Understanding Wind Energy.
- CO 4: Understanding Bio Energy.
- CO 5: Understanding Tidal, Wave, Hydro Thermal Energy.

Unit-Wise Complete Topic List

Unit I — Introduction

Topics: World Energy Use; Reserves of Energy Resources; Environmental Aspects of Energy Utilisation; Renewable Energy Scenario in India and around the World; Potentials; Achievements / Applications; Economics of renewable energy systems.

Unit II — Solar Energy

Topics: Solar Radiation; Measurements of Solar Radiation; Flat Plate and Concentrating Collectors; Solar direct Thermal Applications; Solar thermal Power Generation; Fundamentals of Solar Photo Voltaic Conversion; Solar Cells; Solar PV Power Generation; Solar PV Applications.

Unit III — Wind Energy

Topics: Wind Data and Energy Estimation; Types of Wind Energy Systems; Performance; Site Selection; Details of Wind Turbine Generator; Safety and Environmental Aspects.

Unit IV — Bio-Energy

Topics: Biomass direct combustion; Biomass gasifiers; Biogas plants; Digesters; Ethanol production; Bio diesel; Cogeneration; Biomass Applications.

Unit V — Other Renewable Energy Sources

Topics: Tidal energy; Wave Energy; Open and Closed OTEC Cycles; Small Hydro-Geothermal Energy; Hydrogen and Storage; Fuel Cell Systems; Hybrid Systems.

Practical Work: No practicals listed in the official syllabus for this option.

Reference Books (as listed in the syllabus)

- O.P. Gupta, Energy Technology, Khanna Publishing House, Delhi (ed. 2018).
- Renewable Energy Sources, Twidell, J.W. & Weir, A., EFN Spon Ltd., UK, 2006.
- Solar Energy, Sukhatme. S.P., Tata McGraw Hill Publishing Company Ltd., New Delhi, 1997.
- Renewable Energy, Power for a Sustainable Future, Godfrey Boyle, Oxford University Press, U.K., 1996.
- Fundamental of Renewable Energy Sources, GN Tiwari and MK Ghoshal, Narosa, New Delhi, 2007.
- Renewable Energy and Environment — A Policy Analysis for India, NH Ravindranath, UK Rao, B Natarajan, P Monga, Tata McGraw Hill.
- Energy and The Environment, RA Ristinen and J J Kraushaar, Second Edition, John Willey & Sons, New York, 2006.
- Renewable Energy Resources, JW Twidell and AD Weir, ELBS, 2006.

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Source: BTEUP 3rd Year curriculum (folder2627), approved in C.D.C. meeting held on 16.07.2026. Topic lists follow the official syllabus; short explanations are the author's own plain-English summaries, not syllabus text.

Please confirm with your own polytechnic for any local changes.