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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.