

**BANGLADESH TECHNICAL EDUCATION BOARD**

**DIPLOMA IN TECHNICAL EDUCATION  
SYLLABUS**

**TECHNICAL TEACHERS' TRAINING  
COLLEGE  
Tejgaon Industrial Area, Dhaka-1208.**

# COURSE CONTENTS

## Common Courses in Pedagogy, Education & Science :

### ED- 1114 Instructional Planning & Methodology

**Education and Educational process:** Teaching methods and teaching techniques; Evolution of teaching methods; Teaching-learning process, student centered and activity oriented education

**Instructional planning and Instructional process :** Systems approach, instructional planning process of instructional planning, relation between techniques of teaching and success in learning; content materials arranged in logical sequence, the topic precedent diagram, the scheme of works.

**Teaching-learning strategies :** Lecturer, Demonstration, Question-answer, Discussion, Project, Heuristic Case studies, Seminar, Role playing, Simulation, Programme Instruction, Conference, Workshop practice, Problem solving, Inductive, Deductive, Analytic and Synthetic.

Criterion for selecting methods of instruction.

Efficiency in teaching (qualities of teaching), Psychological basis of teaching, different skill in teaching, technique of developing skills in teaching, team teaching; Micro-teaching concept, process and use.

Lesson classification, lesson planning-introduction, development, consolidation, evaluation of lesson plan and evaluation of teaching, knowledge and skill lesson plan; product and process objectives-taxonomy of educational objectives; selection and use of appropriate learning resources ( lab. sheet, work sheet, exercise sheet, assignment sheets etc.) to enrich teaching-learning processes.

### ED- 1123 Educational Psychology

Introduction to Educational Psychology. Students' growth development and learning. Physical basis of sensation and perception. Motivation and emotion.

Modern theories of Learning. Transfer of Learning. Retention and forgetting. Attitudes. Attention and interest. Intelligence and its measurement-different scales. Individual differences and Learning. Personality evaluation.

**Practical Experiments/Sessional:** Experiments on memory drum, colour perception, illusion, projective test.

### ED- 1132 Educational Technology

Educational Technology-definitions & scope. Communication: types of communication-basic principles of communication & teaching learning process, Communication & media, Communication & Interaction.

**Learning resources :** types of resources (teaching aids). Soft ware & Hard ware, Projected, Non projected, Print, Non print. Audio Visual aids- chalk board, OHP, film projects-radio, audio records & players, video-recorders player, T.V. duplicators. Psycho-philosophical factors of use of a.v. aids in teaching learning process ( theory of a.v. instruction) functions of a.v. aids.

Planning for Learning Resources-in teaching-learning process. System approach-definition, components of instructional system, designing a system. Criterion for selecting different learning resources-Instructional kits, Developing a.v. aids- Instructional material development (programmed learning), module, leaflet.

Computer aided learning. Resource center. Maintaining a.v. equipments & learning Resource Centre.

**Practical Experiments :** Preparation and production of a tutor's learning resource package for chalk board. Preparation and production of a learning package : (a) for Flannel board/Jute board (multipurpose use), (b) for magnetic board by magnetic bound materials. Preparation of over head projector transparencies- (a) simple-text/figure (b) overlapping (c) revelation (d) animation Lay out for and preparation of Teachers' activity sheet & students activity sheet e.g. Lecture note/ Handout/ Job sheet/ Operation sheet/ Experiment sheet/ Laboratory sheet /Assignments sheet. Preparing charts-using different techniques/bulletin board. Basic operational and maintenance skills of audio-visual equipments- (a) OHP (b) Episcopes (c) film projector (d) Slide projector (e) Still camera (f) Video-recorder (g) sound Slide projector (h) Electronic stencil cutter (i) Photo copier (j) Transparency maker (k) Duplicating machine.

### **ED- 1243 Testing and Evaluation in Education**

Role of measurement in human life. Historical background of measurement in Education. Test, Measurement, Assessment and Evaluation-definitions-differences, functions of measurement & Evaluations to teachers, Students, Administrators, Parents.

**Classifications of tests :** classroom test, standardized test, placement, formative, diagnostic and summative. Characteristics of a good test. Basic principles of test construction (planning the test). Essay type test-advantages & disadvantages-methods of improving the test . Objective type test-different types of objectives type of tests, principles of construction. Performance testing, skill testing, for practical works of laboratory work, Intelligence test, Aptitude test, Attitude test, Personality test, Inventory, anecdotal record.

Rating Scale, observation schedule, (skill assessment ) Course work assessment, Item analysis, Scoring, Grading, Reporting, Interpreting, Test Scores. Basic quantitative concepts-central tendency, variability, percentiles-ranks, kurtosis, regression, correlation, normal probability curve & its application.

### **ED- 1254 Technical Education in Bangladesh**

History of the development of Technical Education in Bangladesh. Education system-General Education vis-a-vis technical & vocational education. Problems and prospects of technical education in Bangladesh with special references to polytechnic and vocational institutes. Future changes of technical education in Bangladesh. Comparison of technical education system with other countries.

Curriculum design and development, stages of curriculum development, approaches to the design of curriculum-different curriculum models. Development of curriculum in technical education in Bangladesh/ guide lines. Technical Education curriculum in Bangladesh-retrospect and prospect.

### **ED- 1262 Communication in Teaching & Learning**

Unit I: Communication, definition, nature, concept and scope. Theory of communication. Types of Communication. Communication cycle. Communication and language: Communication through speech, handwriting, printing, telecommunication

Unit II: Person to person, small group, large group and classroom oral communication. Goal directed communication. Communication and learning. The teachers as a communicator. Language sense, style, meaning, feedback. Lecture and Lecture demonstration as communication Interaction. Role of teacher as resourceful communicator.

Unit III: Lecture types. Debate. Discussion. Speech evaluation. The novice speaker/ teacher how to develop his skills and competence. Microteaching as a method of developing skill and competence: Teaching skills, Link practice Role of supervisors in Micro-teaching.

**Practical experiments :** Criticize fellow speaker and Microteaching practice. Prepare a 5 minute informative speech. Write a review on Debate or discussion not exceeding 100 words. Description of an incident or event or phenomenon. Story writing.

### **ED- 1202 Practice teaching**

Preparation of Scheme of Work, Lesson Plan & other teaching materials for designated classes on departmental subjects. Practice Teaching is to be conducted at Polytechnics under guided supervision. At least 24 lesson plans for 24 classes including practical classes (duration at least 4 weeks).

### **SC- 1112 Applied Mathematics-I**

**Algebra :** Binomial Expansion for negative integral index. Exponential Theorem and Logarithmic series. De Moivre's theorem and its applications. Determinant and its applications.

**Trigonometry :** De Moivre's Theorem and its applications. Inverse circular functions.

**Calculus :** Differential- functions, area, change of function, differential, co-efficient, differentiation- function of function, implicit function, explicit function, differential co-efficient, geometrical meaning of differential co-efficient, successive differentiation.

**Integration :** Fundamental integrals, method of substitution, integration by parts, rational integrals

**Set Theory :** Fundamental idea of set theory.

**Statistics :** Measures of central tendency & variability.

### **SC- 1123 Applied Science**

Stress, Strain, Hooke's law, different types of strain, modulus of elasticity, Poisson's ratio interrelation between elastic constants, limiting value of Poisson's ratio, elasticity of gases, deformation of beam by bending, bending moment, cantilever, friction, Co-efficient of friction, laws of friction, applications- Kinetic energy of rotating bodies, moment of inertia, radius of gyration calculation in different cases.

Kinetic theory of gases, ideal & real gas-gas-liquid transition Properties and behaviour of longitudinal and transverse wave. Simple harmonic motion, resonance in sound.

Refraction of light through prism & lenses; combination of lenses, dispersion of light. Visible spectrum and colour, Optical instruments. Direct current circuit: Kirchhoff's law & their application, principle of Wheatstone bridge & its applications, magnetic effect of current, Ampere's law & its applications, magnetic field due to long straight wire & solenoid, electromagnetic induction, Lenz's law, inductance, principle of electric generator.

Chemical reactions, acids, bases & salts-application to engineering problems, atomic structure and bonding (covalent and ionic) electrochemical reactions.

**Practical experiments :** Investigating properties of different materials and verifying Hooke's law. Investigation the nature of elongation of a wire with stress and determination of Young's modulus of a wire. Investigating dynamic and static friction. Investigating rotational motion of different bodies & finding the moment of inertia of a fly wheel. Investigating properties of gases & verifying Boyle's law & Charles' law. Determination of the refractive index of a material/glass. Determination of the focal length and hence to find the power of a lens. Investigating the properties of acid, base & salts. Investigating different circuits. Verification of Ohm's law. To obtain operating characteristics of a filament bulb and to predict its operating filament.

## SC- 1232 Applied Mathematics-II

**Algebra:** Partial Fractions, Matrices and its solutions, Summation of series, Convergency and Divergency.

**Calculus :** Maximum and Minimum, Indeterminate forms, Definite integrations, Beta and Gamma functions,  
First order differential equations.

**Geometry :** Straight lines, Pair of straight lines Parabola and Hy-perbola.

**Vectors :** Definitions, Laws of vectors, Simple applications, Dot and Cross products of vectors and its applications.

## SC - 1243 Applied Mechanics

Introduction and Basic concepts. Resultant and Components of forces; Free body diagrams, Equilibrium of Co-planar and Non Co-planar forces, Centroids, Moment of inertia of area and mass, Kinematics of absolute and relative motions, Friction, Maximum and Minimum forces, Basic mechanics, kinetics of rectilinear and curvilinear motion of particles, Principles of work and energy.

## SC- 1251 Computer Applications

General description of microcomputer systems. Commonly used commands of PC/MS DOS and Windows. Principles of data storage-floppy diskettes, floppy disk drives and hard disks. Rules for naming and managing files. Detailed study of selected software packages. Application of software packages in the production of teaching-learning materials.

**Practical :** Practicing DOS and Windows commands. Completing exercises designed by the class teacher which will cover the key commands and facilities of a selected software package. Exercises to produce instructional materials using a selected software package.

## GS- 1112 Cominucative English-1

**Theory :**

- A. **Listening Skill :** Follow-short talk social exchange, question answer, instruction and set accordingly Take notes from short talk, story and explanation and answer questions that follow in written form.
- A. **Speaking Skill:** Control of Demonstrating-ask and answer questions,request and offers, accept and refuse, Particpate real life conversations in classroom. Workplace and various social situations.
- B. **Writing Skill : Writing skill :** Reinforce grammatical skill, devciop paragraph from hints, write shon paragraph on given topic, write formal and informal teters, write cover letter and resume.

**Practical : Based on theory.**

## GS- 1222 Cominucative English-II

- A. **Speaking Skill :** Control of Demonstration- obtaining information on events objects process.
- B. **Reading Skill :** Spelling, meaning and uses. Reading texts related to everyday life, the environment as well as matters related to technology e.g. tools, machines, production process, engineering materials, science passages and identify related idas of life and nature, science and technology .

- C. **Writing Skill** : Essays and reports on given topic related to Civil/ Electrical and Electronics Mechanical Technology e.g. construction process, generation, telecommunication, production process, industrial hazard, natural resources, modern science and technology.

**Practical** : Based on theory.

### **Technology courses in Civil Engineering:**

#### **CE- 1113 Geotechnical Engineering I ( Technology I)**

Identification and classification of soils; soil grain and aggregate properties; Weight-volume and moisture-density relationships; Soil structure and consistency; Stress-strain characteristics of soils; Permeability; Seepage; Capillarity and flow nets; Hydraulic and Consolidation properties; Compaction; Principles of total and effective stress; Methods of exploration and sampling; Direct measurement of consistency and relative density; correlation of strength parameters with N values; Field exploration and exploratory programmes.

**Practical Experiments:** Water contents; Specific gravity; Grain size distribution (dry and wet); Atterberg's limits; Insitu density; Void ratio and density index; Compaction; Site investigation; Sub-surface investigation.

#### **CE- 1123 Engineering Materials (Technology II)**

Building stones; Bricks and other clay products; Lime; Cement; Chemistry of cement; Aggregates; Concrete; Chemical attack of concrete; Design of concrete Mix; Concrete for special purposes; Cement and lime mortars; Timber and wood based materials; corrosion and its prevention; Paint; Varnishes and metallic coating; Atomic structure and bonding of metals; crystal structures; mechanical properties; Yielding; Fracture; Elasticity; Plasticity; Properties and uses of Rubber; Glass and plastics; Insulating materials; Asphalt, Tar and Bitumen; Ferro-cement.

**Practical Experiments :** Laboratory tests of specific gravity, Unit weight, Moisture content of coarse and fine aggregates. Standard tests of Brick, Cement and concrete. Determination of crushing strength of a brick Determination of absorption of a brick, Determination of initial and final setting time of cement, Tensile and compressive strength of cement mortar; Sounding of cement; Fineness by sieve method of a given sample of cement. Gradation of coarse and fine aggregates. Resistance to abrasion of coarse aggregate. Determination of compressive strength of concrete. Effect of water cement ratio on compressive strength and consistency of concrete.

#### **CE- 1233 Geotechnical Engineering II (Technology III)**

Lateral Earth pressure, stability of slopes; Bearing capacity and Settlement; Various types of foundations; Factors determining the type of foundation; Design of piles; Retaining walls; Dams and well foundations.

**Practical Experiment :** Permeability test (static and falling head Method) Triaxial compression test; Consolidation test-Oedometer and Rowe cell; Unconfined compression test; Direct shear Test and vane shear test; Standard penetration test; Plate load test; California Bearing Ratio.

### **CE- 1243 Fluid Mechanics (Technology IV)**

Fluid and its fundamental properties, fluid pressure, and its measurement, Hydrostatic pressure on surface, Buoyancy and Flootation, fundamentals of fluid flow-types, Energy equation, Equation of continuity, Venturi meter, Orifice, Weir, notches, Friction and pipes flow, Water hammer, flow through open channel-classification, critical flow-its computation, Hydraulic jump, Pumps and Turbine.

**Practical Experiment :** Manometer, Venturimeter, Pitot tube, orifice mouth piece and notches, flow through pipes, Bernoulli's experiment, fluid friction, orifice meter, current meter, sharp and broad crested weir, sluice gate, Determination of Manning's roughness coefficient.

### **CE- 1253 Architectural Professional Practice (Technology IV)**

Profession of Architectural ; Professional life; Services rendered by architect; Architect and his client; Contractor, Employees; Relation with other professionals; Professional Societies; Professional ethics; Working organization and their activities; securing works; General Conditions of contracts; Tender, Bidding procedure, receiving tenders, Opening tenders, Analysis and comparison, Award, Laws of contract. Types of contract; Administration of Contract; Housing standard; labour laws and housing codes.

**Practical :** Based on theory

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