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 proccss 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,colur perception, illusion, projective test.

ED- 1132 Educational Technology

Educational Technology-definitions & sope. Communication: types of communication-basic principles of communication & teaching learning process, Communication & media, Commnication & 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) Episcope (c) film projector (d) Slide projector (e) Still camera (f) Video-recorder (g) sound Slide prijcetor (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 Edcation 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-retrospeet and prospect.

ED- 1262 Communication in Tcachnig & 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 Lechure demonstration as cimmunication Interaction. Role of teacher as resourceful communicator.

Unit III: Lecture types. Debate. Discussion. Speech evaluation. The novice speaker/ teacher how to develop his shills 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 it 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. Demoiver's theorem and its aplications. Determinant and its applications.

Trigonometry : Demoiver'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-cfficient, geometrical meaning of differential co-efficient, successive differentiation.

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

Set Theory : Fundamental idea of set theory.

Statistics : Measures of central tendency & variability.

SC- 1123 Applied Science

Stress, Strain, hooks law, different types of strain, modulus of elasticity, posission's ratio interrelation between elastic constants, limiting value of poission'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, idesl & 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: Kirchoff'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, lenze'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 hook'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.

Calclus : 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 desciption 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 styudy 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 Sklil : Follow-short talk social exchange, question answer, instruetion and sct aecondingly Take notes flom 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 offiers, accept and refuse, Particlpate real life conversations in classroom. Workplace and various social situations.

B. **Writing Skill : Writing skill :** Rcinforce grammatical skill, devciop paragraph from hints, write shon paragraph on given topic, write formal and informal tetters, write cover letter and resume.

Practical : Based on theory.

GS- 1222 Cominucative English-II

A. **Speaking Skill :** Control of Demonestration- obtaining information on events objects process.

B. **Reading Skill** : Spelling, meaning and uses. Reading texts related to everyday life, the enbironment 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. **<u>Writing Skill :</u>** **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 scienee and technology.**

<u>Practical :</u> Based on theory.

Tcehnology coursess in Electrical & Electronics Engineering.

EEE - 1113 Measurements and Networks (Technology I)

Basic principles of analogue & digital instruments. Basic design, construction and operation of cathode ray osilloscopes. Comparison of analogue and digital instruments. Loading effect of instruments. Shunt and multiplier design. Measurement of Power and wattmeters. Measurement of enegy and energymeters. Power factor and frequncy measurements. Electric circuits and network theorems - Kirrchhoff's laws, solving equations with two and three unknowns, superpostion theorem, Thevenin's theorem and its equivalent circuit, Nortons theorem and its eqluivalent circuit, delta/star and star/delta transformations, Network solution using a computer. Maximum power transfer theorem. Mathematical and trigonometrical representation of phasors. Significance of operator J and its application in ac circuit analysis, R-L-C resonant ckt-series and parallel. Types of transients. Electrical differential equations and their solutions. Time constant. Steady state and transient response of R-L and R-C series circuit. Fundamentals of filters. Introduction to Fourier analysis.

Practical Experiments : Design and test shunts and multipliers. Measurements of amplititude, frequency and phase using the CRO. Investigate loading effects of digital and analouge instruments. Measurement of Power,energy,Power factor and frequency. Investigate Kirchhoff's superposition,Thevenin's and Norton's theorem. Investigate Star-Delta networks. Simulation and solution of networks, using a computer. Investigate steady state and transient response of R-L and R-C series cirlcuits. Investigate the characteristics of single pole filters. Harmonic detection of Fourier components.

EEE 1123 Basic Electronics (Technology II)

Introduction to semiconductor materials- charge carriers in semiconductors- holes and electrons, P-type and n-type impurities. Semiconductor Diodes- N junction, V-I characteristics, special purpose diodes. Power Supplies - full wave & Half wave rectifiers, Filters & voltage regulation ; Bipolar

Transistors & Field Effect Transistors - types, biasing, characteristics and circuit applications. Amplifiers:Graphical analysis, load lines, dc and small signal model for both BJT & FET-Practical amplifier circuits including push-pull amplifiers.Operational amplifiers-basic principles and applications. Feedback and oscillation-types, principles, Phase-shift oscillator & Multivibrators. Digital Logic fundamentals- basic gates, Boolean algebra and minimisation techniques.

Practical Experiments: Junction diode, Zener diode and transistor characteristics. Investigation into the behaviour of power syupply circuits and voltage regulators. Measurement of transistor gain and investigate the transistor as a switch. Investigate the behaviour of discrete Bipolar and FET transistor amplifiers. Investigate the behaviour of operational amplifiers. Investigate the behaviour of discrete. Bipolar transistor, FET and operational amplifier oscillators. Design and verification of practical logic circuits.

EEE 1233 Machines, Instrumentation and Control (Technology III)

Principle of transformer- EMF equation, equivalent circuit, open circuit and short circuit tests, losses and efficiency and voltage regulation. Three phase transformer connections- current and voltage relations. CT and PT principles and their applications. Operating Principles, characteristics and applications of dc and ac rotating machines - including torque/speed characteristics and their specific applications (pumps, compressors, fans and machine tools). Operating principles, characteristics and application of thermocouples, thermistors, potentiometers, light dependent resistors, optical switches, linear variable differential transformers and strain gauges. Bridge Op - Amp measurements & bridge amplifiers.Basic relay circuit sequential control. Open and closed loop control systems -on-off and continous control. introduction to control system chagracteristics and stability - including steady state error and practical proportional control (eg speed, temperature, position ctc.) Power control using power bipolar transistors, field effect transistors, thyristors, triacs and diacs.

Practical Experiments: Transformer open circuit , short circuit and regulation tests. Ac and dc machine characteristics. Air cooler and fan investigations. Thermistor characteristics. Potentiometer linearity. LDR characteristics. Optical switch characteristics strain gauge characteristics. Strain measurements. Bridge amplifiers. LVDT investigation. Speed and temperature control system tests and evaluation. Basic relay circuit control. Power transistor switching and control characteristics. Thyristor and triac controllers.

EEE 1243 Microporcessor and Microcomputer Technology (Technology IV)

Number system and Binary arithmatic. Introduction to microprocessors and microcomputers. Architecture of a typical 8 -bit microporcessor system (MPU,RAM,ROM, Bus system and I/O). Machine code programing. Assembly Language programming. Microprocessor support chips and interfacing.

Practical : Verify the behaviour of key instructions using practical data manipulation. Implement key instructions using the main addressing modes (immediate, direct, indirect, indexing etc.)

Develop machin code and assembly language programmes to solve basic data manipulation problems. Develop I/O control programmes to perform simple interfacing tasks.

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