



Term of Reference (TOR) of Project

“Development of Computerized Examination System for DAE (Electronics) Technology”

1. BACKGROUND OF THE PROJECT

The Punjab Board of Technical Education is a statutory body established under the Punjab Board of Technical Education (Amended) Act, 1977. It is a corporate body to control, develop and regulate Technical, Commercial and Vocational Education as well as Trade and Skill courses upto Diploma level in the Province of Punjab. It works within the territorial limits of the Province of Punjab and such other areas as may be notified by the Government from time to time. Its main functions are

- To accord, refuse or withdraw recognition wholly or partly after considering inspection reports received from an Inspection Committee appointed by the Board in this regard.
- To hold and conduct all final examinations pertaining to Technical, Commercial and Vocational education below degree level and such other examinations as may be determined by the Government.
- To grant Certificates and Diplomas to persons who have passed its examinations.
- To lay down conditions for admission to its examinations and determine eligibility of candidates
- To prescribe courses of study for its examinations.

PBTE conducts examinations for 195 different courses of Technical, Commercial and Vocational streams. For the purpose of examination 772 institutes from public and private sectors have been affiliated with the Board. Approximately 350 employees are working in various branches of the Board.

The PBTE intends to modernize student's assessment procedures by standardizing the processes of test construction and scoring. The system of examination will gradually be shifted from paper pencil testing to online testing. For this purpose PBTE seeks to engage a testing and evaluation consultant institution to undertake this project.

2. SPECIFIC OUTPUTS EXPECTED FROM CONSULTANT / DELIVERABLES

The main objective of this exercise is to bring about a major shift in the examination system of PBTE in order to gradually move from paper pencil testing to online testing. The task of the consultant institution will include, but not limited to:

- a. Identification of subject specialists, their training & tasking for Item/Question Bank Development
- b. Preparation of detailed tables of specifications for recently introduced DAE program for electronic technology.
- c. Development of Item/ question banks according to the tables of specifications with a rigorous and sustainable system of their continuous growth and ease of retrieving/withdrawing item through various IT based paper setting systems.
- d. Setting-up a system of item analysis that can generate reports on regular basis on test reliability and various item characteristics such as item difficulty and discrimination indices, distracter effect etc.
- e. Development of an IT based system of paper setting that could generate multiple copies of parallel tests keeping in view following parameters.
 - Difficulty level should permit average students to pass the examination

- It should differentiate average, good, and very good students.
 - Attemptable in designated time.
 - Discourage selective study.
- f. Establishment of a system of assessment of various aspects of the test validity by human experts.
 - g. Development of scoring system for structured response, restricted response and free response test items/ questions by using optical mark readers with 100% accuracy.
 - h. The system should be capable to maintain 100% confidentiality/security of the question papers and other sensitive data.
 - i. Development of a system for a smooth but gradual transition from paper pencil testing to computer based testing.
 - j. Development of a transparent and reliable system of sessional and practical of students' evaluation capable for online data transmission.
 - k. The testing system should generate computerized individual as well institutional profiles for multiple purposes.
 - l. Development of human resource to ensure the sustainability of the new system

Consultant institution would be required to complete the whole assignment within a period of 09 months. The consultant firm will be responsible for:

| Activity # | Description | Time Period |
|------------|---|-------------|
| 1 | Identification, selection and training of 30 subject experts in electronic technology. | 6 weeks |
| 2 | Preparing tables of specifications and item/question banks for each subject containing not less than 2000 items in each bank. | 4 weeks |
| 3 | Pilot testing of all items to be included in the item/question banks. The item characteristics will be worked out to make them a part of each item through standard item analysis procedures such as CTT or IRT. | 8 weeks |
| 4 | Develop robust computer software for paper setting/marking out of item/question banks already established in this project. The software should be capable to produce multiple parallel tests. The system should also have a built in system for the assessment of test validity by human experts. | 8 weeks |
| 5 | Development of a transparent and reliable system of sessional and practical of students' evaluation capable for online data transmission. | 6 weeks |
| 6 | Preparing a detailed implementation plan including the manpower, equipment and material required with estimated cost. | 4 weeks |
| 7 | Awareness campaign for students, teachers and institutions | 6 weeks |

| Activity # | Description | Time Period |
|------------|--|-------------|
| 8 | Availability of consultant institution for supervision of First Annual 2011 DAE (Electronics) Examination for fine tuning of proposed computerized examination system. | 4 weeks |
| 9 | Preparation of a comprehensive report of the project at the termination of the project. | 4 Weeks |

Consult institution will also serve on the technical committee to procure equipment and material. He will also help in recruiting and/or development of human resource for the project.

Note: Payment is subjected to valid Bank guarantee from scheduled bank and it will be adjusted in four equal installments.

4 ELIGIBILITY:

Academic organizations and universities that meet following criteria are eligible to apply for award of consultancy. Individuals are not eligible to apply for this consultancy.

Expertise: The applicants should have a team of preferably foreign qualified consultants in the field educational testing and evaluation.

Relevant Experience: The applicant should have relevant experience particularly in using OMR technology.

Experience of completing similar projects: The organization should have a clear record of successful completion of similar project.

5 **EXPRESSION OF INTEREST:** Punjab Board of Technical Education invites organizations to express their interest to carry out this project by **August 30, 2010**. The duration of this consultancy would be 9 months (**1st October 2010 to 30th June 2011**). The expression of interest must contain:

- The institutional profile with a proof of legal status
- CVs and consent papers of the team involved
- Detailed technical proposal and financial proposals (In a separate sealed cover)

Note: Scheme of Studies for DAE (Electronics) Technology is available on next pages

ELECTRONICS TECHNOLOGY

SEHEME OF STUDIES

| FIRST YEAR | | | T | P | C |
|--------------------|-----|---|-----------|-----------|-----------|
| Gen | 111 | Islamiat & Pakistan Studies | 1 | 0 | 1 |
| Eng | 112 | English | 2 | 0 | 2 |
| AMath | 123 | Applied Mathematics-I | 3 | 0 | 3 |
| APhy | 112 | Applied Physics | 1 | 3 | 2 |
| ACh | 112 | Applied Chemistry | 1 | 3 | 2 |
| Comp | 112 | Computer Fundamentals | 1 | 3 | 2 |
| El.T | 114 | Electrical Circuits | 3 | 3 | 5 |
| El.T | 123 | Electronics Devices | 2 | 3 | 3 |
| El.T | 132 | Engineering Drawing & Computer Aided Design | 0 | 6 | 2 |
| El.T | 141 | Electrical Wiring | 0 | 3 | 1 |
| T o t a l | | | 14 | 24 | 22 |
| SECOND YEAR | | | | | |
| Gen | 211 | Islamiat & Pak Studies | 1 | 0 | 1 |
| AMath | 213 | Applied Mathematics-II | 3 | 0 | 3 |
| Coms | 211 | Communication Skills | 1 | 0 | 1 |
| El.T | 212 | Electromagnetics | 2 | 0 | 2 |
| El.T | 225 | Analog Electronics | 3 | 6 | 5 |
| El.T | 233 | Electrical Instruments & Measurements | 2 | 3 | 3 |
| El.T | 243 | Electrical Machines | 2 | 3 | 3 |
| El.T | 253 | Communication Systems | 2 | 3 | 3 |
| El.T | 264 | Digital Electronics | 3 | 3 | 4 |
| El.T | 271 | PCB Fabrication | 0 | 3 | 1 |
| T o t a l | | | 19 | 21 | 26 |

THIRD YEAR

| | | | | | |
|---|-----|--|-----------|-----------|-----------|
| Gen | 311 | Islamiat & Pak Studies | 1 | 0 | 1 |
| Mgm | 311 | Industrial Management & Human Relations | 1 | 0 | 1 |
| OSHE | 311 | Occupational Safety, Health and Environment | 1 | 0 | 1 |
| El.T | 314 | Microprocessor and Applications | 3 | 3 | 4 |
| El.T | 322 | Equipment Maintenance & Servicing | 0 | 6 | 2 |
| El.T | 332 | Project | 0 | 6 | 2 |
| Optional Group (any one group should be opted). | | | | | |
| Group A | | Electronics | | | |
| El.T | 343 | Industrial Electronics | 2 | 3 | 3 |
| El.T | 353 | Power Electronics | 2 | 3 | 3 |
| El.T | 363 | Microcontroller Programming and Applications | 2 | 3 | 3 |
| Group B | | Communication | | | |
| El.T | 373 | Digital Communication System & Networks | 2 | 3 | 3 |
| El.T | 383 | Communication links & Radar | 2 | 3 | 3 |
| El.T | 393 | Multimedia Systems. | 2 | 3 | 3 |
| Total | | | 12 | 24 | 20 |