BRAC University Proposed Department of Industrial Engineering

Tentative Curriculum Outline

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| Year 1 | Year 2 | Year 3 | Year 4 |
| Basics | Tools | More Tools | Applications |
| Work Analysis and Design | Physical Ergonomics | Cognitive Ergonomics | Textiles / Garments |
| Probability | Statistics | Risk and Decision Analysis | Transportation / Logistics |
| Information Systems | Discrete Event Simulation | Supply Chain Management | Health Care |
| Manufacturing Processes | Operations Research | Lean Manufacturing | Agriculture |
| Engineering Drawing | Project Management | Digital Manufacturing | Construction |
| Mathematics | Quality and Reliability | Socio Technical Systems | Electronics |
| Anatomy and Physiology | System Safety | Internal Group Project | External Group Project |
| Psychology | Engineering Economics | Internal Group Project | External Group Project |
| Design | Research Methods | Internal Group Project | External Group Project |

It is said that “Engineers engineer, industrial engineers engineer engineering”. Following this theme, and precedents from various US Universities, alternative titles of this degree may add “Operations,” “Systems” or “Manufacturing”.

The topics in this proposed undergraduate Industrial Engineering curriculum start with basic science and engineering, followed by two years of ‘tools and techniques’ and a final year that addresses particular manufacturing and service industries, common in Bangladesh. The third year has a semester long internal project in which groups of students explore the Internet for information on their chosen topic. The final year involves in depth study of (up to 3) different Bangladesh industries using a group based “flipped approach” rather than formal lecture based courses, and a group project in an external manufacturing or service setting.

This tentative curriculum consists of 24 formal classes, spaced over 3 semesters (or 4 quarters) per year, each consisting of 3 hours per week face to face lectures with class sizes of approximately 25 students. The group based activities in the third and fourth years will require some faculty guidance. Final examinations will be conducted for the formal classes, whereas the applied and project based activities will be assessed by report and presentation evaluations.

Assuming each faculty member will have the knowledge to teach 3 to 5 topics, the department will require between 7 and 12 faculty members, including a department chair. Faculty members may be assisted by teaching assistants, especially for larger demand / class size. The Industrial Engineering department will also require 1 or 2 administrative assistants.

Assuming an average faculty salary plus benefits of $50,000 per year, the annual personnel (faculty, staff and teaching assistants) budget will be approximately $500,000 – this figure will require more detailed analysis.

Recruitment of faculty will be from candidates with local or overseas qualifications, preferably at the doctoral level, and industrial experience. Alternatively, faculty will be recruited on part time / visiting contracts on a course by course basis.

Given the current trend towards on line teaching, faculty members may be domiciled either locally or abroad. However administrative staff would be expected to be resident in Bangladesh.

Brief descriptions of course topics

1. Work Analysis and Design – Time and motion study, work place layout
2. Probability- Mathematical basis of uncertainty, statistical distributions
3. Information Systems – Information and communication theory, data bases, Internet
4. Manufacturing processes – Metal forming, plastics, automation
5. Engineering drawing – sketching, computer aided design and manufacturing
6. Mathematics - Review of algebra, geometry, trigonometry, calculus
7. Anatomy and Physiology - Structural and functional anatomy, respiratory and circulatory physiology
8. Psychology – Sensation, attention, perception, memory, decision making, motor control
9. Design – Requirements, focus groups, simulations, product evaluation
10. Research methods - controlled experiments, surveys, data analysis
11. Physical Ergonomics - Anthropometry, biomechanics, work physiology
12. Statistics – experimental design, data analysis, hypothesis testing
13. Discrete event simulation – Activity cycle diagrams, queuing theory, manual simulation, simulation packages
14. Operations Research - Mathematical programming, optimization,
15. Project Management - Activity and sequence analysis and optimization
16. Quality and Reliability – Data capture and analysis, control processes
17. System Safety – Accident analysis, analysis of safety data, design for mitigation and prevention
18. Engineering Economics – The value of money over time, cost analysis, forecasting, optimization.
19. Cognitive Ergonomics – Human information processing, human error, usability testing, facilitators
20. Risk and Decision Analysis – Decision theory, failure modes and effects analysis
21. Supply Chain Management – Analysis of life cycle of products and processes, logistics, controls
22. Lean Manufacturing – Cost analysis, inventory management, optimization
23. Digital Manufacturing – Manufacturing process automation
24. Socio – Technical Systems – Balance among technology, processes, human interfaces and outcomes