



DEPARTMENT OF INDUSTRIAL AND PRODUCTION ENGINEERING

HEAD OF DEPARTMENT PROFILE



Professor Victor Oluwasina Oladokun, Ph.D., MNSE, a Professor and the Head of the Department of Industrial and Production Engineering, University of Ibadan, Nigeria, is a Senior Fulbright Scholar, and a Commonwealth Academic Fellow. Professor Oladokun, who was the pioneer Deputy Director of the University of Ibadan School of Business, is a certified SAP consultant a member of the Academic Board of SAP University Alliances Africa, and a member of the Commonwealth Scholarship Commission Alumni

Advisory Panel. He teaches courses in Applied Optimization, Operation Management, Project Management, Reliability Engineering, Soft Computing, Entrepreneurship, Supply Chain Management, and Enterprise Systems. Prof Oladokun, who the Chairman of UI Board Information Technology and Media Services (ITeMS), is the PI & coordinator of the UI-SAP-Enterprise System Education for Africa (ESEFA) project an initiative aimed at enhancing the employability of our graduates through professional certification in ES skills. Prof Oladokun who is the UI coordinator of the Engineering for the Future CoRE (Cluster of Research Excellence) of ARUA, has published over 80 academic papers in international journals, proceedings, and edited books. He has extensive experience in mentoring, leadership, curriculum development, multidisciplinary research, and international collaboration. He has served as a visiting Research Fellow at Universities in the UK, USA, and Nigeria. As the Chair of the Department of Industrial and Production Engineering, he led the successful development and deployment of the professional Master's Program in Engineering Management to create a vital university-industry linkage. His current research interest includes Energy systems modeling, Disaster risk management, and resilience modeling with the aim of generating insights about communal systems and processes that influence urban resilience and how to frame or integrate such insights into policy formulation and practice.

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WELCOME REMARK

Our department has a rich heritage, being the pioneering institution of its kind in West Africa. Established in 1980, we initially introduced Industrial Engineering concepts as service courses for students within the Faculty of Technology. The subsequent approval of our undergraduate program by the University Senate in the 1983/84 session marked a significant milestone. In 1984/85, we proudly admitted our first cohort of students. Over the years, we have expanded our offerings to encompass postgraduate programs, including M.Sc., MPhil, and Ph.D. degrees. In 2012, we introduced the Professional Masters in Engineering Management program, followed by the addition of the Enterprise System (ES) program with SAP-ERP certification in 2014. Our programs are groundbreaking, setting new standards in Nigeria, and have consistently attracted enthusiastic interest from prospective students. We have a vibrant Alumni Association that supports our town-gown engagement and industry collaboration. In keeping with the ever-evolving global landscape, we continually review and enhance our courses, with a particular focus on areas such as supply chain management, computer software development, entrepreneurship, lean manufacturing, and automation.

Department Vision:

The vision of this department is to be nationally and internationally recognised as a leader in academic excellence with superior reputation in teaching, research and professional services.

Department Mission:

- To serve the diverse constituencies of students, industry, business and government, in an efficient and effective manner;
- To continuously improve the quality of service provided in the area of teaching, research and community services.
- To produce Engineering graduates who are worthy in character and sound judgment

We invite you to embark on this journey of knowledge, innovation, and excellence with us as we strive to shape the future of Industrial and Production Engineering together. Welcome to a world of endless possibilities.

Professor V. O. Oladokun

Head of Department

MASTER OF SCIENCE IN INDUSTRIAL AND PRODUCTION ENGINEERING

1.1 Programme Philosophy and Objectives

The development and running of our programme are based on the philosophy that rapid integration between academic studies and real-life applications in both the industry and public service is what makes a good Engineering programme. It is in following this philosophy that, in all core courses of the proposed programme, students will be encouraged to collect data and test Engineering models in real life situations. The main objective is to prepare our students on how best to combine Engineering analytical tools, computing and socio-economic principles for quality decision making and implementation in complex engineering management situations.

1.1.1 Objectives:

The objectives of the MSc Industrial and Production Engineering Programme are to ensure that students who pass through the programme will be adequately equipped with the knowledge and orientation to:

- (i) Understand, appreciate and define the type and scope of organisations' technological problems in Industries and Public Service.
- (ii) Scientifically develop or adapt appropriate technological methodologies for solving these problems.
- (iii) Adopt managerial measures to effectively deal with safety, large scale productivity, finance, organisational and other technology related management issues.
- (iv) To graduate Industrial and Production Engineers with sufficient computing, communication and Engineering management skills with the intent to enhance their professional growth, career leadership and global competitiveness.

1.2 Strategies for Achieving the Objectives

The following are departmental strategies for achieving the stated objectives:

- Provide a receptive, encouraging and supportive learning atmosphere for students through staff/students' motivation, peer assessment of, and regular student feedback on teaching quality
- Strive towards national and international visibility and reputation through archival publications, patents and meaningful student projects.
- Form strategic alliances with national and international academic departments for collaborative effort in staff development, teaching, pursuing research grants and research.

- Develop a departmental balance in teaching, research and community services (consulting engagement) for effective professional development.
- Engage the support of alumni and advisory board in achieving the goals of the programme.

GENERAL REGULATIONS

2.1 Admission Requirements

Applicants must possess an engineering honours degree from a university recognised by the senate of University of Ibadan.

2.2 Duration of study

Full Time: The duration of the programme shall be a minimum of three semesters for the full-time students

Part Time: The duration of the programme shall be a minimum of five semesters for the part-time students.

Note: Students with none Industrial Engineering background may be required to audit some selected undergraduate level courses as may be prescribed by the department. This may necessitate spending an additional semester on the programme.

2.3 Condition for Award of Degree

In addition to satisfying all the general requirements of the Post Graduate School, in order to graduate, a student must pass a minimum of thirty (30) units of the programme. These must include twenty-three (23) units of compulsory courses and at least six (6) units from students' areas of specialisation.

AREAS OF RESEARCH

- (i) Ergonomics/Human Factors Engineering
- (ii) Production/Manufacturing Engineering
- (iii) Operations Research
- (iv) Engineering Management
- (v) Systems Engineering

LIST OF M.Sc COURSES

Compulsory Courses

Course Code	Course Title	Units
TIE 702	Research Methodology for Engineers	2
TIE 711	Statistical Methods for Engineers	2
TIE 712	Applied Optimisation	2
TIE 731	Advanced Engineering Economics	2
TIE 741	Advanced Work Systems Design	3
TIE 742	Production-Inventory Systems Design	2
TIE 746	Advanced Manufacturing Process	2
TIE 799	Seminar	2
TIE 790	Project	6

Required Courses

Course Code	Course Title	Units
TIE 734	Terotechnology	2
TIE 738		2
TIE 747	Engineering Organisation and Management Advance topics in Industrial Engineering	2
TIE 750	Product Development	2
TIE 751	Ergonomics	2

Elective Courses

Operations Research Option

		Units
TIE 720	Multi-criteria Optimisation	3
TIE 713	Linear and Integer Programming	3
TIE 714	Nonlinear Optimisation	3
TIE 715	Machine Activity Scheduling	3
TIE 716	Graph Theory and Network Flows	3
TIE 717	Applied Stochastic Processes	3
TIE 718	Evolutionary Techniques	3
TIE 719	Discrete Optimisation	3
TIE 727	Computer Application and Software Development	2

Systems Engineering Option		Units
TIE 717	Applied Stochastic Processes	3
TIE 718	Evolutionary Techniques	3
TIE 722	Systems Simulation	3
TIE 723	Applied Systems Analysis	3
TIE 724	Control Engineering	3
TIE 725	Advanced Information Systems	3
TIE 726	Energy Systems Modelling	3
TIE 727	Computer Application and Software Development	2

Engineering Management Option		Units
TIE 727	Computer Application and Software Development	2
TIE 730	Performance Management	3
TIE 732	Research and Development Management	3
TIE 733	Project Planning and Control	3
TIE 735	Cost Analysis and Valuation in Engineering	3
TIE 736	Industrial Safety Management	3
TIE 737	Technological Forecasting and Assessment	3
TIE 739	Logistics and Supply Chain Systems	3

Production and Manufacturing Engineering Option		Units
TIE 727	Computer Application and Software Development	2
TIE 739	Logistics and Supply Chain Systems	3
TIE 740	Robotics in Manufacturing	3
TIE 743	Computer-Aided Manufacturing	3
TIE 744	Advanced Industrial Quality Control	3
TIE 745	Advanced Facilities Design	3
TIE 748	Materials and Manufacturing System Design	3
TIE 749	Welding Technology	3

Ergonomics and Human Factors Engineering		Units
TIE 727	Computer Application and Software Development	2
TIE 736	Industrial Safety Management	3
TIE 745	Advanced Facilities Design	3
TIE 752	Work Physiology	3
TIE 753	Man-machine Systems	3
TIE 754	Bioenvironmental Engineering	3

PROFESSIONAL POSTGRADUATE PROGRAMMES

About the Professional Master in Engineering Management

Management of large engineering systems presents peculiar challenges in a developing economy like Nigeria. The managers of such systems must be adequately familiar with both the technical and management aspects of the systems. Nigeria lacks sufficient human capacity in managing large engineering projects and systems mainly due to the fact that many engineers in Nigeria evolve into supervisory roles without the required blend of advanced engineering and business education to succeed in today's market. Hence many practising engineers appear not to be adequately equipped or prepared for the management aspect of large engineering projects and operations. While many middle career engineers in Nigeria have tried to fill this gap with courses in Business Administration, the challenge remains largely unresolved hence the need for an engineering-based postgraduate's management course.

In Nigeria, many engineering corporations employ large number of expatriates to manage engineering projects, or expend huge resources to send some few Nigerian Engineers abroad for trainings. This approach is not sustainable on the long term, and is inimical to Nigeria's quest for self-reliance and increased level of local content in the management of engineering projects and operations. It should also be noted that the curricula of engineering management programmes in most foreign universities have been tailored towards solving problems in the host countries' techno-economic environment. Therefore, it often turns out these 'imported' engineering managers, who have been trained based on course contents and case studies designed for developed economies, are grossly ineffective in handling Nigeria's techno-management problems. Hence, the need for home grown post graduate engineering management programme designed to transform our practising engineers to competent managers.

The country continually experiences large-scale management problems in:

- Technology-triggered business investments and organisational developments;
- Energy and utilities availability crises;
- Technology systems development, selection, adaptation, maintenance replacement, promotion and marketing;
- Environmental pollution and operational safety;
- Running manufacturing, mineral exploration, construction and transportation systems and skilled human resources development and management.
- Effective commercialisation of technological products and innovations

For years, these problems have been begging for pragmatic solutions. One possible reason for this may be the absence of a crop of Engineers capable of adopting effective managerial skills to turn things around. Indeed, it can be easily established that the nation's inability to move forward industrially is partly linked to these problems.

It is to produce a crop of Engineers adequately equipped to handle such managerial problems that the Department of Industrial and Production Engineering, University of Ibadan decided to introduce the Master of Engineering Management (M.E.M) Programme. It is a unique programme intended mainly for post-experience Engineering graduates. The M.E.M programme has therefore become a programme for preparing Engineers, Technologists and other professionals for effective participation in the management of engineering and technology-based organisations, and management of technological change.

Programme Philosophy and Objectives

The development and running of our programme are based on the philosophy that rapid integration between academic studies and real-life applications in both the industry and public service is what makes a good Engineering programme. It is in following this philosophy that, in all core courses of the proposed programme, students will be encouraged to collect data and test Engineering models in real life situations.

The main aim is to prepare Engineers on how best to combine Engineering analytical tools, computing and socio-economic principles for quality decision making and implementation in complex Engineering Management situations.

Programme Objectives

A. The M.E.M programmes seek to enable learning about:

- (i) The concepts, theories, types and scope of organisations' technological problems;
- (ii) Scientific selection, adaptation and management of appropriate technology;
- (iii) The use of managerial measures to effectively deal with safety, large scale productivity, finance, organisational and other technology related management issues
- (iv) Innovations, leadership, communication and knowledge-sharing in the formulation and execution of organisational technology policies and strategies

B. Programme Expected Outcomes:

By the end of the programme, students should be able to:

- I. Explain the concepts, theories, types and scope of organisations' technological problems

- II. Analyse scientific selection, adaptation and management of appropriate technology
- III. Develop strategies to effectively deal with safety, large scale productivity, finance, organisational and other technology related management issues
- IV. Design implementation framework for exploring business opportunities and transferring innovations in organisational and technology business development.

PROGRAMME STRUCTURE

The programme is structured such that candidates will have the choice to pursue Master of Engineering Management with the following areas of specialisation:

- i. Work systems, Ergonomics and Safety Management
- ii. Procurement, Logistics and Supply Chain Management
- iii. Project Management
- iv. Maintenance, Facilities and Asset Management

GENERAL REGULATIONS

Admission Requirements

- i. Applicants should normally possess an engineering degree from a recognised University.
- ii. HND graduates in engineering with a minimum of 2 years work experience may be considered.
- iii. An applicant with relevant science based non-engineering degree/HND and has at least five years cognate experience in engineering-based industry with relevant professional certifications may be considered.

Mode of Instruction

The mode of instruction shall be hybrid lectures, tutorials, practical and case studies. Both physical and virtual mode of interaction would be adopted for lecture delivery.

Duration of study

Full-Time mode of study: The duration of the programme shall be a minimum of three (3) semesters for the full-time students.

Part-Time mode of study: The duration of the programme shall be a minimum of five (5) semesters for the part-time students.

Condition for Award of Degree

In order to graduate, a student must take and pass a total of at least forty-five (45) units of the programme. These must include the twenty-four (24) units of general compulsory core

courses, eight (8) units of compulsory in the area of specialisation and at least thirteen (13) other units from students' preferred option.

COURSE LISTINGS

CORE COURSES (24 UNITS)

All courses in this section must be taken and passed by all students.

S/N	Code	Course Title	Unit	Status
1	TEM 750	Statistical methods for Engineers	3	C
2	TEM 751	Applied Optimisation and System Modelling	3	C
3	TEM 752	Introduction to project management	3	C
4	TEM 753	Engineering Economics and Corporate Finance	3	C
5	TEM 755	Work study	3	C
6	TEM 758	Industrial Quality Management	3	C
7	TEM 709	Organisational Design and Human Resources Management	3	C
8	TEM 799	Special Industrial Project and Term paper	3	C

WORKSYSTEMS, ERGONOMICS AND SAFETY MANAGEMENT OPTION

Students who choose this option must pass a minimum of 21 units (including all compulsory) of the listed courses.

S/N	Code	Course Title	Unit	Status
1	TEM 712	Human Factors Engineering	3	C
2	TEM 764	Safety Engineering and Management	2	C
3	TEM 715	Industrial Ergonomics	3	C
4	TEM 754	Technological Innovation and Entrepreneurship	2	R
5	TEM 706	Finance and Accounting for Engineers	2	R
6	TEM 707	Leadership, Communication and Interface Management	2	R
7	TEM 761	Industrial Accidents and Emergencies Management	2	R
8	TEM 713	Health, Safety and Environment Management Systems	2	R
9	TEM 716	Bioenvironmental Engineering	2	E

10	TEM 767	Corporate Security and Hazard Control	2	E
11	TEM 722	Production-Inventory Models in Supply Chain Systems	2	E
12	TEM 743	Reliability Engineering	2	E
13	TEM 774	Procurement and Purchasing management	2	E
14	TEM 783	Enterprise Resource Planning (Erp) And Enterprise Systems	3	E
15	TEM 776	Introduction to lean six sigma	2	E

PROCUREMENT, LOGISTICS & SUPPLY CHAIN MANAGEMENT OPTION

Students who choose this option must pass a minimum of 21 units (including all compulsory) of the listed courses.

S/N	Code	Course Title	Unit	Status
1	TEM 774	Procurement and Purchasing management	2	C
2	TEM 721	Introduction to logistics and Supply Chain Systems	2	C
3	TEM 723	e-Commerce and Supply chain management	2	C
4	TEM 727	Production Systems and Supply Chain	2	C
5	TEM 754	Technological Innovation and Entrepreneurship	2	R
6	TEM 706	Finance and Accounting for Engineers	2	R
7	TEM 707	Leadership, Communication and Interface Management	2	R
8	TEM 712	Human Factors Engineering	3	R
9	TEM 722	Production-Inventory Models in Supply Chain Systems	2	E
10	TEM 725	Logistics Infrastructures and Support Systems	2	E
11	TEM 726	Supply Relationship Management	2	R
12	TEM 728	Strategic Planning and Supply Chain Management	2	E
13	TEM 787	New Product Development	3	E
14	TEM 783	Enterprise Resource Planning (Erp) And Enterprise Systems	3	E
15	TEM 776	Introduction to lean six sigma	2	E

PROJECT MANAGEMENT OPTION

Students who choose this option must pass a minimum of 21 units (including all compulsory) of the listed courses.

S/N	Code	Course Title	Unit	Status
1	TEM 733	Project And Activity scheduling	2	C
2	TEM 784	Cash flow management, project costing and Control	3	C
3	TEM 787	New Product Development	3	C
4	TEM 754	Technological Innovation and Entrepreneurship	2	R
5	TEM 706	Finance and Accounting for Engineers	2	R
6	TEM 707	Leadership, Communication and Interface Management	2	R
7	TEM 712	Human Factors Engineering	3	R
8	TEM 735	Strategic Management and Engineering	2	R
9	TEM 774	Procurement and Purchasing management	2	E

10	TEM 722	Production-Inventory Models in Supply Chain Systems	2	E
11	TEM 741	Maintenance Systems Design & Management	3	E
12	TEM 783	Enterprise Resource Planning (Erp) And Enterprise Systems	3	E
13	TEM 776	Introduction to lean six sigma	2	E

MAINTENANCE, FACILITIES AND ASSET MANAGEMENT OPTION

Students who choose this option must pass a minimum of 21 units (including all compulsory) of the listed courses.

s/n	Code	Course Title	Unit	Status
1	TEM 794	Asset and Facilities Management	3	C
2	TEM 741	Maintenance Systems Design & Management	3	C
3	TEM 743	Reliability Engineering	2	C
4	TEM 754	Technological Innovation and Entrepreneurship	2	R
5	TEM 706	Finance and Accounting for Engineers	2	R
6	TEM 707	Leadership, Communication and Interface Management	2	R
7	TEM 712	Human Factors Engineering	3	R
8	TEM 774	Procurement and Purchasing management	2	E
9	TEM 713	Health, Safety and Environment Management Systems	2	E
10	TEM 742	Engineering Stores & Spare Parts Management	2	E
11	TEM 744	Machinery and Equipment Maintenance	2	E
12	TEM 745	Electrical and Electronics Systems Maintenance	2	E
13	TEM 746	Buildings Services and Maintenance	3	E
14	TEM 783	Enterprise Resource Planning (Erp) And Enterprise Systems	3	E
15	TEM 776	Introduction to lean six sigma	2	E

COURSE SYNOPSIS ACADEMIC M.Sc.

Course Description

Courses		Units
Course Code	Course Title and Synopsis	No of Contact hours (T:P) Units
1	TIE 702 RESEARCH METHODOLOGIES FOR ENGINEERS Definition and types of research, Research scope in Technology, Selecting/defining a research problem and steps in conducting Engineering research, Literature review, Research design and methods, Experimental design, Writing research reports, thesis, Referencing systems, bibliography and oral presentation, Writing research proposals and grant seeking, Research ethics.	LH: 30; HP: 0; U 2; P: 0. C
2	TIE 711 STATISTICAL METHODS FOR ENGINEERS Review of basic concepts of probability and statistics. Statistical inferences and industrial applications. Correlation and regression. Introduction to experimental design and statistical surveys. Case studies in Industrial and Systems Engineering.	LH: 30; HP: 0; U 2; P: 0. C
3	TIE 712 APPLIED OPTIMISATION Formulation of optimization problems in engineering. Theory of linear, non-linear and combinatorial programming. Convex programming and engineering applications. Emphasis shall be placed on model development, generation and implementation of heuristics and algorithms for engineering problems.	LH: 30; HP: 45; U: 3; P: 0. C
4	TIE 713 LINEAR and INTEGER PROGRAMMING Linear and integer programming problems in industry. The simplex algorithm, Duality. Linear programming algorithms and heuristics. Industrial applications. Algorithm implementation and computer programmes for large systems. The shor-Khacian algorithm.	HL: 30; HP: 45; U:3;P:0 E.
5	TIE 714 NON-LINEAR OPTIMISATION Problem formulation and approximation. Optimality conditions, algorithms and heuristics for constrained and unconstrained problems. Problems with special structures-multi-stage decision problems, geometric programming, least-squares problems, separability, etc. Industrial application and computer codes.	HL: 30; HP: 45; U: 3; P: TIE 413, E.
6	TIE 715 MACHINE/ACTIVITY SCHEDULING Deterministic/stochastic sequencing problems. Problems involving single and multiple facilities. Measures of effectiveness. Algorithms and heuristics. Implementation and practical considerations. Case studies.	HL: 45; HP: 45; U: 3; P: 0 E
7	TIE 716 GRAPH THEORY AND NETWORK FLOWS Graphs and network. Basic external and combinatorial problems on graphs. Max-flow, min-cost, multi-commodity flow problems.	HL: 30; HP: 45; U: 3; P:0, E.

		Application of networks and graph theory to plant layout, assignment, routing and transportation problems. CPM and PERT, Computer codes.	
8	TIE 717	APPLIED STOCHASTIC PROCESSES Markov processes queuing theory and renewal processes, with applications to replacement studies, industrial maintenance, information systems, production inventory and assembly line balancing. Computer simulation of practical stochastic processes in selected industries.	HL: 30; HP: 45; U: 3; P: 0, E.
9	TIE 718	EVOLUTIONARY TECHNIQUES Introduction to random-based solution space searching algorithms and metaheuristics. Differences between conventional optimization techniques/exact algorithms and evolutionary algorithms. Population-based algorithms, genetic algorithm, evolution strategies and genetic programming : Swarm intelligence: Ant colony optimization and particle swarm optimization. Other metaheuristics: simulated annealing and tabu search. Applications and case studies.	HL: 30; HP: 45; U: 3; P: 0, E.
10	TIE 719	DISCRETE OPTIMISATION Concepts in Combinatorial mathematics. Discrete Optimization Models: Linear Integer Programmes, Lumpy Linear Programme, Assignment and Matching models, Knapsack, Set partitioning, Set covering, Set parking, etc. Computational Complexity and NP hard problems: Travelling Salesman Problem, Routing models, Scheduling Models etc. Discrete Optimisation solution Methods: optimising algorithms and heuristics; Exhaustive search and implicit enumeration methods such as Branch and bounds, Set-Sequencing, Strong LP Relaxations methods, Dynamic programming methods. Computer application.	HL: 30; HP: 45; U: 3; P: 0, E.
11	TIE 720	MULTICRITERIA OPTIMISATION Examples of multi-criteria decision situations in manufacturing and service industry , Pareto optimality/Pareto dominance relations, Goal programming, Linear aggregation/ weighted-sum scalarization methods, Non-linear aggregation methods, Compromise programming, Applications of multi-criteria optimization in engineering.	HL: 30; HP: 45; U: 3; P:0, E.
12	TIE 722	SYSTEM SIMULATION System representations. Generation of pseudo random numbers and variates. Using FORTRAN or PL/1. Statistical considerations in simulation design. Special stimulation language – SIMCRIPT, GPPS, ETC. applications of large-scale engineering operations, production distribution systems and health-care systems.	HL: 30; HP: 45; U: 3; P: TIE 711, E
13	TIE 723	APPLIED SYSTEMS ANALYSIS Detailed treatment of the essential stages in systems analysis. Definition of objective, model formulation; system design, testing	HL: 45 HP: 45; U: 4; P: TIE 711; TIE 712, E

		implementation, and maintenance. Selected applications. Transportation systems; Water Resources involving multiple water uses; etc.	
14	TIE 724	CONTROL ENGINEERING concepts: Feedback, feed forward and closed loop control. Review of Control mathematics: Laplace transform, Block diagrams, vector and matrices. MATLAB and other software tools for control. Analysis of Linear systems. Time-invariant systems. State Variables representation and Analysis. System Stability concepts, Fuzzy logic for control systems. Non-linear systems. Case studies and implementation	HL: 30 HP: 45; U: 3; P:0 E
15	TIE 725	ADVANCED INFORMATION SYSTEMS Systems objectives. Feasibility studies. Input/Out design considerations. Hardware acquisition. Safety and reliability considerations. Applications to manufacturing information systems. Implementation and performance evaluation.	HL: 30; HP: 45; U: 3; P: 0, E
16	TIE 726	ENERGY SYSTEMS MODELLING Energy sources and energy conversion installations. Introduction to power systems engineering. Economics analysis of energy systems. Environmental considerations in energy systems. Energy policy issues. Case studies.	HL: 30; HP: 45; U: 3; P: 0, E
17	TIE 727	COMPUTER APPLICATIONS The use of selected computer packages to Solve Engineering Problems. Selected Operating Systems and Database management systems. Software system development approaches. System security. Soft Computing concepts and application. Networking. Web applications etc . Case Studies.	HL: 15; HP:30; U:2; P:0; E
18	TIE 730	PERFORMANCE MANAGEMENT Performance Management, meaning, system and Process. Performance Measures, organizational requirements. Efficient and effective Performance. Productivity theories, Measures and Models. Organizational Development, Work force Motivation and management Control. Case Studies.	HL: 30; HP:0; U:2; P:0; E
19	TIE 731	ADVANCED ENGINEERING ECONOMICS Project evaluation procedures. Fund flow price changes, investment, replacement, taxes capital. Capacity expansion planning. Markovian and other stochastic decision processes, and engineering applications. Economic institutions of interest to engineers. Case studies.	HL: 30; HP: 0; U: 2; P: 0, C
20	TIE 732	RESEARCH AND DEVELOPMENT MANAGEMENT The function of R&D. Policies and methods of R&D. Procedures for the selection, termination, scheduling and evaluation of R&D projects. Value Engineering. Case studies.	HL: 45; HP: 0; U: 3; P: 0, E
21	TIE 733	PROJECT PLANNING AND CONTROL Stages in industrial project development, feasibility study, project proposal detailed design, implementation and commissioning.	HL: 45; HP: 0; U: 3; P: 0, E

		Computer and manual techniques in planning, scheduling and control of project, CPM and PERT. Calculations based on time data. Scheduling to minimize and resource usage.	
20	TIE 734	TEROTECHNOLOGY Choice of plant and machinery. Maintenance strategies and policies. Decision making and statistics. Reliability and maintainability, maintenance planning controls and documentation. Stock control of spare parts, components and materials. Replacement policies, maintenance cost and budgets. Feedback maintenance information for plant design.	HL: 45; HP: 0; U: 3; TIE: 711, C
21	TIE 735	COST ANALYSIS AND VALUATION IN ENGINEERING Process analysis and product cost determination. Product cost reduction techniques. Cost control procedures. Methods of financial statement and budgeting in manufacturing. The relation between accounting and engineering functions.	HL: 45; HP:0; U:3;P:0; E
22	TIE 736	INDUSTRIAL SAFETY ENGINEERING Safety considerations in the design and operations of industrial systems. Optimum integration of man, machine and materials for the safety of industrial environments. Analysis and control of hazard, including health standards and regulations. Management of loss control programmes, product safety and liability.	HL: 45; HP:0;U:3; P:0; E
23	TIE 737	TECHNOLOGICAL FORECASTING AND ASSESSMENT Broad view of technology. Technological changes and impact on society. Quantitative technique in technology assessment; scenario development, utility theory and group decision making, worth assessment and cross impact analysis. Technological change models and input-output analysis.	HL: 45; HP:0; U:3; E
24	TIE 738	ENGINEERING ORGANISATION AND MANAGEMENT Principles and practices utilized in engineering organizations for effective planning implementation and control. The relationships between engineering objective and organisational structures, staffing and procedures are considered.	HL: 30; HP:0; U:2; P:0; R
25	TIE 739	LOGISTICS AND SUPPLY CHAIN SYSTEMS Building blocks of a supply chain network. Production-inventory models and business processes in supply chains. Logistics infrastructures and support systems, purchasing and logistics. Multi-echelon systems design and analysis. Strategic Planning And Supply Chain Management. Tactical and operational decisions in supply chains. E-commerce and supply chain management Supply chain performance measures.	LH: 45; HP: 0; U: 3 ; P: 0. E
26	TIE 740	ROBOTICS IN MANUFACTURING Basic concepts in Robotics and Robots, Types of robots. Method of actuation; Pneumatic, hydraulic and electric servo vs. Nonservo. Linkage and actuators working envelopes, Hard automation vs	HL: 30 HP:45 0;U:3;P: E

		Robots. Components and configurations, Power supply controller, Basic and special configuration approaches. End-of-Arm tooling, Wrist grippers, welders, spray guns, Special Tooling. Programming, Teach pendants offline programming, Input /output interfacing, Applications: machine loading and unloading, welding, spray painting, inspection assembly. Cost effectiveness, Cost of robot, Cost of tooling, Cost of programming, Return on investment,, Human factors management, Factory personnel safety. Selection and installation,	
27	TIE 741	ADVANCED WORK SYSTEMS DESIGN Analysis and design of work systems including methods engineering advanced work measurement techniques and their relation to work systems control. Process design facilities planning and productivity improvement techniques.	HL: 30; HP: 45; U:3; P:TIE 711, C
28	TIE 742	PRODUCTION-INVENTORY SYSTEMS DESIGN Deterministic, probabilistic, dynamic and multi-stage production-inventory models. Manual and computerized procedures in inventory management. Materials requirement planning. Case studies.	HL: 30; HP:0;U:2;P:TIE 711, TIE 712, C
29	TIE 743	COMPUTER-AIDED MANUFACTURING Computer-aided design and control of manufacturing operations, with emphasis on machining, materials handling and production control. Group technology manufacturing systems. Parts classification and computer grouping algorithms. Computer-aided product design.	HL: 30; HP: 45; U: 3; P: 0, E.
30	TIE 744	ADVANCED INDUSTRIAL QUALITY CONTROL Overview of the industrial quality control problem with emphasis on recently development techniques. Control charts. Theory of runs. Non-normal variables, sampling plans and treatment of outliers in industrial data. Economics of quality control methods.	HL:30; HP:0; P:TIE 711, E.
31	TIE 745	ADVANCED FACILITIES DESIGN Essentials of industrial systems design. Plan location and layout for productivity improvement. Current practices in the design, operations and management of materials handling systems control of materials flows. Case studies.	HL:30; HP:45;U:3;P:0; E.
32	TIE 746	ADVANCED MANUFACTURING PROCESSES Manufacturing materials and processes. Metallurgical considerations, non-metallic materials, deformation processes, Metal removal theory. Processes economics. Advanced manufacturing techniques	HL:15; HP:45;U:2;P:0; C.
33	TIE 747	SPECIAL TOPICS IN INDUSTRIAL ENGINEERING Advanced topics selected according to departmental recommendations.	HL:30; HP:0;U:2;P:0;
34	TIE 748	MATERIAL DESIGN AND SELECTION IN MANUFACTURING	HL:30; HP:45;U :3; TIE

		Material selection consistent with functional requirements and process capabilities. Redesign of a product to facilitate manufacturing. Tolerances surface finish and surface integrity. Economic consideration, Exploring the engineer's responsibility in light of conflicting interests of designer, manufacturer management, customer and public.	746, E
35	TIE 749	WELDING TECHNOLOGY Definition of welding terms, welding codes and standards, selection of welding consumables, Physics of welding, Welding processes, Welding metallurgy, Welding stresses and distortion, welding defects, destructive and nondestructive tests, Weld joint design principles, Failure analysis of welded structures, economics and safety in welding	HL:30;HP:45; U: 3 ; P; TIE 746, E
36	TIE 750	Product Development Application of concurrent engineering, team work, Reverse engineering and other concepts to new product development Product conceptualization, market survey, product design and prototyping including the application of computer aided design facilities. Research and Development (R & D); process design, operations design and facilities design; organizing for production, production policies and strategies formulation; product maintainability reliability, case studies and exercises.	HL: 15; HP:45; U:2; P:0; R.
37	TIE 751	ERGONOMICS Design of equipment and facilities to suit capabilities and limitations. Topics include functional anatomy and physiology of the muscle-skeletal system and their application in work design. Introduction to work physiology, kinesiology, anthropometry and their application to work physiology, kinesiology, anthropometry and their applications.	HL:15;HP:45;U:2 ;P: TIE 714, R
38	TIE 752	WORK PHYSIOLOGY Study of cardiovascular, pulmonary and muscular responses to occupational work. Aspects of endurance, fatigue, recovery and the energy cost of work. Utilization of the physical work capacity and job desires, personnel assignment and assessment of work-rest scheduling.	HL:30;HP:45;U:3 ;P: TIE 711. E
39	TIE 753	MAN-MACHINE SYSTEMS Man-machine concepts. Perceptual-motor performance with emphasis on man's information processing capabilities. Human limitations in work systems. Human factors in the designs systems.	HL: 30; HP: 45; U: 3; P: 0, E
40	TIE 754	BIOENVIRONMENTAL ENGINEERING Evaluation and control of mechanical, physical and chemical environments. Human work performance in environments of heat, cold noise, vibration, light pressure radiation and air contaminants. Case studies.	HL:45;HP:0;U:3; P: TIE 711, E

41	TIE 755	<p>BIO-MECHANICS ENGINEERING Definitions; Need for occupational biomechanics biomechanical model development; the structure and functions of the musculoskeletal system including muscle structures, and contraction; mechanical aspects of muscle contraction; joints and joint lubrication; Anthropometry in occupational; biomechanical, mechanical work capacity evaluation; occupational biomechanical models including simple-segment dynamics biomechanical model manual material handling limits, etc.</p>	<p>HL:45;HP:0;U:3; P:0</p>
42	TIE 790	<p>PROJECT An IE application problem for each student. Problem choice to be approved by academic adviser who would also supervise the project.</p>	<p>HL:0; HP:0; U:6 ; P:0</p>
43	TIE 799	<p>SEMINAR This should include the use of Projectors and slides in the presentation of technical information</p>	<p>HL:15; HP:15; U:2; P:0</p>

COURSE SYNOPSIS PROFESSIONAL PROGRAMME : MEM

Courses			Units
	Course Code	Course Title and Synopsis	No of Contact hours (T:P) Units
1	TEM 750	<p>Applied Statistics For Engineers</p> <p>Review of Basic probability concepts, random variables, probability density and mass function. Introduction to statistical methodology with emphasis on engineering applications: probability distributions, estimation, hypothesis testing, confidence intervals, regression, analysis of variance, quality control, introduction to experimental design and statistical surveys. Statistical Inference and Engineering Decision. Case studies, computer software applications in analytics and Engineering. Practical classes in the use of relevant statistical packages to conduct statistical analysis. Interpretations of statistical output to inform decision making.</p>	(30: 45) 3
2	TEM 751	<p>Applied Optimisation and Systems Modelling</p> <p>Formulation of optimization problems in engineering. Theory of linear, non-linear and combinatorial programming. Relevant Computer packages and applications. Dynamic programming, queuing theory and applications. Emphasis shall be placed on model development, generation and implementation of heuristics and algorithms (e.g. Genetic, simulated annealing, taboo search) for engineering problems. Case studies and applications. Computer software, soft computing and machine learning techniques for systems optimisation. Simulation design and discrete event simulation. Applications to large-scale engineering operations, production and distribution systems, health-care systems digital twin modeling etc.</p>	(30: 45) 3
3	TEM 753	<p>Engineering Economics And Corporate Finance</p> <p>Economic analysis of engineering projects. Value systems, economic decisions on capital investments and choice of engineering alternatives; new projects, technology selection and replacement and abandonment policies, risky decisions; corporate financial practices. Project evaluation procedures. Fund flow,</p>	(45 0) 3

		price changes, capacity expansion planning, sources of fund, portfolio Management, financial engineering concepts and applications, financial analytics and business intelligence Deterministic and stochastic decision processes and engineering applications. Economic institutions of interest to engineers corporate financial practice.	
4	TEM 754	Technology Innovation And Entrepreneurship Concepts of Entrepreneurship, corporate entrepreneurship and Intrapreneurship. Techno-managerial problems in small and medium enterprises (SME). Creative thinking and its applications, Disruptive innovation and business models. Technology assessment. Economic and Social considerations. Industrial advisory services, industrial development centres and benchmarking. Export corporation and ancillary business. Business plans, Economic and technical feasibility studies, finance sourcing strategies. Legal services for business, Customer care and supply relationship management. Team dynamics and team effectiveness. Identification and analysis of business opportunities in some areas, e.g. Equipment leasing, Software and ICT, Agro processing, Trainings and engineering consultancies	(30 0) 2
5	TEM 755	Workstudy Work Methods Analysis and Design including charting techniques, operations analysis, micromotion studies, principles of motion economy and workplace layout. Establishing standard procedures and applications. Principles and Techniques of Work Measurement including Time Study, Work Sampling, Systems of Predetermined Motion Time, Data and Estimating Techniques. Industrial Applications	(30: 45) 3
6	TEM 758	Industrial Quality Management Overview of quality tools, methodologies, Control charts and applications. Introduction to formal quality systems such as QS-9000, ISO/TS 16949 etc. Quality assurance techniques including total quality management, quality circles, process capabilities studies and investigation, industrial quality problems, Product safety and liability, material quality control, Statistical quality control and improvement. Service quality management. Industrial	(30: 0) 2

		quality control problem with emphasis on recent development and techniques.	
7	TEM 783	<p>Enterprise Resource Planning and Enterprise Systems Introduction to Enterprise Resource Planning (ERP) and Enterprise Systems, Evolution of enterprise systems; Operations Management in enterprise systems. Business processes such as Procurement, sales, inventory management, accounting , Asset management in Enterprise systems. Enterprise wide business integration. Business analytics and data management tools for ES. Exploring Enterprise Information Systems for small and Medium-Sized Enterprises; Contemporary issues in enterprise information systems practice, EIS for Supply Chain Management; Enterprise systems technology integration such as ES in SCADA, GIS, Computer aided manufacturing , etc Case studies, certification routes and options in ES software such as SAP, oracle, Sage, Jd Edwards, etc. Free and Open Source Enterprise Resources Planning tools,</p>	(30 45) 3
8	TEM 761	<p>Industrial Accidents and Emergencies Management Accidents occurrence prediction models. Accident investigation and reporting, Accident costs and costing. Accident preventions tools such as Failure Mode and Effects Analysis, Design Review Based on Failure Mode etc. Industrial emergency procedures, Logistic support for Emergency situations. Case studies. Introduction to phases of Emergency management, litigation, preparedness, response and recovery Find and rescue, first aid, shelter, security, evacuation, Disaster management, Crowd control and management. Case studies.</p>	(30: 0) 2
9	TEM 764	<p>Safety Engineering and Management Detection, analysis and control of hazards. Analysis techniques e.g. Fault trees, Failure mode and effects analysis. Accident investigations and analysis of data. Environmental modifications for Safety effectiveness and accident prevention. Safety codes. Materials handling. Machine guarding. Fire safety, Electrical hazards. Analysis and control of hazards, health standards and regulations. Product safety and liability Case studies on special occupational hazards.</p>	(45 :0) 3
10	TEM 774	<p>Procurement and Purchasing Management The make or buy decision, strategic purchasing and supply. Contract law and overview of relevant aspects of the procurement</p>	(30: 0) 2

		Act, The procurement cycle (procure to pay), Requirements and source of supply , Process of tenders, procurement and purchasing, vendor selection problem, development and evaluation negotiation and contract, purchase order, scheduling management, logistics, receipt and payment systems. Overview of public procurement regulation and due processes, Transnational procurement. E-commerce and e-procurement. Digital procurement systems. Case studies	
11	TEM 752	<p>Introduction To Project Management</p> <p>Organization of larger scale resource all allocation. Project planning and control basics, Stages in industrial project development, feasibility study, project proposal detailed design, implementation and commissioning, Technology assessment. Economic and Social considerations. Optimisation in project management; CPM, PERT, GERT, PDM,VERT. Project organization and definition of objectives. Projects task elements identification techniques and diagramming, planning and progressing construction. Status and Milestone Reports Project risks analysis. Applications of Computer Aided software in project management.</p>	(45: 0) 3
12	TEM 784	<p>Cashflow Management, Project Costing And Control</p> <p>Costing and cost elements, analysis and traditional approaches. Costing Models e.g. Activity-based costing (ABC). Cost tools and drivers. Cost estimating, Statistical estimating; Value Engineering and Analysis. Cost reduction techniques. Cost control procedures. Methods of financial statement and budgeting. Cash Management: Cash management objectives; Cash flow forecasting; Excess liquidity: short-tern investing, Real option analysis in projects. Real world applications and real life case studies.</p>	(45: 0) 3
13	TEM 787	<p>New Product Development</p> <p>Product conceptualization, market survey, product design and prototyping including the application of computer aided design facilities. Research and Development (R & D); process design, operations design and facilities design; organizing for production, production policies and strategies formulation; consideration of maintainability reliability in new product development product liability, Application and exercises in computer aided design</p>	(30: 45) 3

		tools such as autocad inventor, solid works and others .	
14	TEM 794	<p>Assets And Facilities Management: Introduction to concepts of Assets and facilities, Concepts of Terotechnology, Facilities planning including analysis and design, benchmarking and strategic planning. Financial management for facilities management. Facilities condition assessment. Project management and integration Real Estate portfolio management Sustainable design. Overview and current state of FM technologies, i4.0 facilities and systems , digital twin techniques; Case studies and certification routes</p>	(30: 45) 3
15	TEM 776	<p>Introduction To Lean Six Sigma Overview of six sigma and organization. Value of lean six sigma, how its philosophy and goals should be applied. Quality pioneers, significance, process inputs-outputs and feedbacks. Cost-benefit analysis including cost of quality and cost of poor quality etc. Organisational goals and six sigma projects. Drivers and metrics including Voice of Customer (VOC), Balance Score Card/Dashboard, Key Performance Index, Root-Cause-Analysis including Fish-borne-chart, 5 Whys, Cause-and-effect analysis, FMEA. Lean principles in organization including lean concepts of value, wastes, value stream, mapping and value stream. Lean tools of waste reduction, cycle time reduction, kaizen, kanban, 5-S, TPM, etc. DMAIC phases of Define, Measure Analyze, Improve and Control Phases and how they can lead to product or process improvement. Case studies</p>	(30: 0) 2
16	TEM 706	<p>Finance and Accounting for Engineers The nature, scope and purpose of Accounting in Engineering Management. Planning of sources of finance: Capital structure, Capital gearing, Capital Budgeting, Risk Management, Introduction to Working Capital Management. Conceptual framework of financial accounting, Asset-equity relationships – accounting records – theory and practice of measurement of business income. Valuation of assets and methods of depreciation. Financial statements and their construction. Legal framework of company accounts – Financial statement information.</p>	(30: 0) 2
17	TEM 707	<p>Leadership, Communication and Interface Management The transition of the engineer to manager; study of management roles and theories, organisational systems and behavior,</p>	(30: 0) 2

		managing and motivating technical personnel, leadership, communication, processes, and customer focus. Management Information System. Introduction to conceptual framework of interface management. Laws of safety and health at work.	
18	TEM 709	Organisational Design and Human Resources Management Organisational design problem elements, variables and types of organisational structure. Principles and procedures of Organisational design. Organisational design algorithms and computer applications. Work load determination and human utilization appraisal model. Performance management to include target setting, appraisal and motivation principles and models; the concept of the autonomy of individuals and learning organization approaches. Human Resources Management, Project Manager Roles and Responsibilities, Problem Solving and Managing Meetings. Case studies	(45: 0) 3
19	TEM 712	Human Factors Engineering Human performance in man-machine systems. Human sensory, motor and information processes. Man-machine dynamics. Design of equipment, facilities and workspaces to suit human capabilities and limitations. Topics include functional anatomy and physiology of the muscle-skeletal system and their application in work design. Introduction to work physiology, kinesiology, anthropometry and their application to work systems design. Case studies	(45: 0) 3
20	TEM 713	Health, Safety and Environment Management Systems Issues in Environmental audit, impact and analysis. Industrial waste management, Effluent Treatment Plants. Health and safety training programmes, Environmental effects on human performance. Occupational Health and Safety, Inherent Safety Design (ISD) of Workplace and work systems. Health Safety and Environment (HSE) Systems in selected companies, computer applications. Case studies.	(30: 0) 2
21	TEM 715	Industrial Ergonomics Ergonomics; definition and historical considerations. The human 'machine' basic work functions; the immediate human work environment, people, machines, tools, workplace design, postures, controls, display as related to human performance. Human limiting factors; energy requirement, rest requirement, workload, aerobic capacity, endurance limits, motivation and training, anthropometric and human performance. Ergonomic evaluation; biomechanics, manual task handling and occupational	(45: 0) 3

		safety. Case studies	
22	TEM 716	Bioenvironmental Engineering Evaluation and control of mechanical, physical and chemical environments. Human work performance in environments of heat, cold, noise, vibration, light, pressure, radiation and air contaminants, applications of robotics in hazardous environment. Case studies.	(30: 0) 2
23	TEM 717	Corporate Security and Hazard Control Information systems security essentials. Security devices and gadgets; system design and implementation. Insurance and workmen compensation. Security service outsourcing and service providers.. Big Data, Internet of things and cyber security.	(30: 0) 2
24	TEM 721	Introduction To Logistics and Supply Chain Systems Building blocks of a supply chain network. Systems definition, Systems entities and attributes analysis. Business processes in supply chains. Types of supply chains and examples. Strategic tactical and operational decisions in supply chains. Supply chain performance measures.	(30: 0) 2
25	TEM 722	Production-Inventory Models in Supply Chain Systems Demand forecasting. Deterministic and stochastic inventory models for single and multiple item systems. Capacity analysis and Production Scheduling, Material Requirement Planning (MRP), Lot sizing. Just-In-Time (JIT), Supply chain inventory management; Newsboy, Base-stock, and (Q, r) models, multi-echelon supply chain, bullwhip effect. Case studies	(30: 0) 2
26	TEM 723	e-Commerce and Supply Chain Management Design, analysis, and implementation of e-commerce systems. Internet-enabled supply chains; e-marketplaces, e-procurement; e-logistics, e-fulfillment, Information infrastructure, enterprise models, enterprise processes, enterprise views. Data structures and algorithms used in e-commerce systems. Case studies.	(30: 0) 2
27	TEM 725	Logistics Infrastructure And Support Systems Freighting and Tracking facilities. Logistics solutions software. Logistic service providers. Outsourcing. Processing and distribution systems for Agricultural products. Warehousing, Security facilities, Containerised cargo movement, Optimising transportation network. Electronic tagging systems eg RFID. Case studies.	(30: 0) 2
28	TEM 726	Supply Relationship Management Supplier development, supply development and supply relationship, Contract law and Contract drafting,	(30: 0) 2

		community/Corporate Social Responsibility (CSR) as a Supply Relationship Management issue. Best practice supply chain solutions. Customer relationship management, web services. Fraud detection and prevention	
29	TEM 727	Production Systems and Supply Chain Types of production systems e.g. craft, mass, batch, lean, flexible. Horizontal and vertical integration. Manufacturing systems with relationship to SCM. Small lot production, setup-time reduction, continuous improvement, push and pull systems, equipment maintenance etc. Production planning and operations scheduling. Case studies.	(30: 0) 2
30	TEM 728	Strategic Planning And Supply Chain Management Identifying and quantifying supply chain improvements opportunities. Value chain assessment and optimization of the supply chain business model, including network, financial and tax consideration. Value chain system integration of transactional systems and decision support tools. Mathematical models for supply chain planning, design and optimization. Performance modelling of supply chains. Case studies.	(30: 0) 2
31	TEM 733	Project and Activities Scheduling Scheduling and sequencing criteria including make span, lateness, tardiness and mean flow time. One and multiple facility optimal scheduling, multi-facility heuristic scheduling and applications. Deterministic and Stochastic scheduling Problems. Problems involving single and multiple facilities. Measures of effectiveness. Algorithms and heuristics. Resource constrained scheduling problems . Case studies.	(30: 0) 2
32	TEM 735	Strategic Management and Engineering Management concepts and strategic management; Tools, and techniques for Strategic Planning such as discrete even simulation approaches; systems dynamic models; forecasting models; game theory and artificial intelligence; large scale decision data generation and gathering; analysis of internal activities for constraints removal, capacity expansion and adjustments, marking; competitive strategies and vertical integration; Just-in-time strategies, diversification and strategic alliances: enterprise redesign management creativity, innovation and change in technical systems case studies.	(45 :0) 3
33	TEM 741	MAINTENANCE SYSTEMS DESIGN And MANAGEMENT The maintenance function and maintainability of man-machine	(30: 45) 3

		systems. Organisation for efficient maintenance. Maintenance consideration in Engineering Systems design. Failure analysis, replacement theory, preventive and corrective maintenance. Maintenance analysis and economics. Policy formulation and implementation. Computerised Maintenance management Systems. Case studies.	
34	TEM 742	ENGINEERING STORES And SPARE PARTS MANAGEMENT Pareto or ABC analysis, inventory systems, Stock control of spare parts, components and materials. Store layout and organisation. Store security. Requisition and issuance policies. Suppliers/ vendors selection and management. Case studies.	(30: 0) 2
35	TEM 743	Reliability Engineering Reliability of components and multi-component systems. Applications of quantitative methods to the design and evaluation of Engineering and Industrial Systems and of Processes for assuring reliability of performance. Economic and manufacturing aspects of reliability. Principles of maintainability, product failure and legal liability. Case studies.	(30: 0) 2
36	TEM 744	Machinery And Equipment Maintenance Choice of plant and machinery. Maintenance strategies and policies. Decision making and statistics. Maintenance Repairs and Overhauling, Troubleshooting, in-house vs outsourcing, Maintenance scheduling, maintenance planning, controls and documentation. Replacement policies, maintenance cost and budgets. Feedback maintenance information for plant design. Case studies.	(30: 0) 2
37	TEM 745	Electrical And Electronic Systems Maintenance Electrical systems maintenance, diagnosis and repair Battery and charging systems maintenance, Heating and air conditioning systems and components maintenance, Electrical and electronic systems maintenance, Introduction to Electrical Systems Code. Case studies	(30: 0) 2
38	TEM 746	Building Services And Maintenance Application, installation, maintenance, repair of Air-Conditioning Equipment, Cooling towers, Pipings, Valves, Pumps, Expansion Tanks etc. Water supply, Electrical supply and waste disposal systems in Buildings. Case studies.	(30: 0) 2
39	TEM 799	Special Industry Project and Term Paper	(0 135) 3

POSTGRADUATE LECTURERS



Professor V.O. Oladokun

B.Sc. (Ife), M.Sc., Ph.D. (Ibadan), MNSE, MNIM, MNIEM,
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Soft Computing



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Engineering Management and System Analysis