

# **Bachelor of Science in Engineering Management**

**School of Engineering and Technology**

**Akamai University**

**Dr Khoo Voon Ching and Dr. Douglass Capogrossi**

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Engineering Management is a specialized form of management that is concerned with the application of engineering principles in the arena of business practice. Engineering management brings together the technological problem-solving knowledge of engineering and the organizational, administrative, and planning abilities of management in order to oversee complex enterprises from conception to completion. Areas of engineering management include product development, manufacturing, construction, design engineering, industrial engineering, technology, production, and other fields which employ personnel performing engineering functions.

## **TARGET AUDIENCE**

Participants in the Bachelor of Science in Engineering Management are prepared to lead and manage engineering operations and staff. While pursuing the Bachelor's degree in Engineering Management, our students learn to apply business management principles to the engineering field. Students may focus their practicum and senior project on the management of a particular engineering discipline within which they are prepared. The U.S. Bureau of Labor Statistics (BLS) indicates that the top-employing industries for engineering managers include engineering service firms, manufacturing, research and development [[www.bls.gov](http://www.bls.gov)]. Many engineering management positions require individuals with experience as engineers in the field they will be managing. These might include: quality assurance manager, systems engineering manager, project manager, and manufacturing engineering manager.

## **PROGRAM FACULTY**

**Khoo Voon Ching, MS.BA, PhD**

**Program Director, Engineering Management**

Khoo Voon Ching holds two Master's degrees, namely, the M.Sc. by Research from Asia eUniversity and a Master of Business Administration degree from Akamai University, USA. Voon Ching obtained his professional qualifications as an incorporated engineer from the Engineering Council, UK, and as a certified planning engineer from the American Academy of Project Management, USA. He also studied in the University Technology of Malaysia to obtain his diploma in Mechanical Engineering and in Institute First Robotics Industrial Science to acquire an advanced diploma in Robotics and Automation Engineering. Voon Ching is also obtained the PhD in Management from Akamai University. Voon Ching has many years of industry experience, specializing in automation and semiconductor testing. He first worked for ASM Assembly Equipment as a service engineer before he moved to Semiconductor Testing Automation. As a sales manager with COHU, Inc., he was involved in multi-site test handler sales and service activities. He implemented multi-site testing handlers in many MNCs involved

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in semiconductor testing, which primarily aimed to reduce testing costs. His research interests include technology management, cost reduction through technology, and the efficiency of technology to improve human condition. Mr. Khoo is a member of the Institution of Mechanical Engineers and the International Associations of Engineers. He is a fellow of the American Academy of Project Management.

### **Niranjan Ray, B.S.E.E. (Hons.), M.S.E.E., Ph.D. (Engineering)**

#### **Dean, School of Engineering and Technology**

Dr. Ray is a Program Director of Corporate Training (Six Sigma), and Deputy Program Director for the Akamai University Business Administration Program. He is a president of Roswell 83, LLC (3 star hotel, Motel 6), and board of directors of 101 Crescent, Inc. (3 star hotel, Quality Inn & Suites). Dr. Ray received his B.S.E.E (Hons.), M.S. E.E. and Ph.D. (Engineering) from Jadavpur University in India. He has taught at several universities including Jadavpur University, India, Engineering University, Bangladesh and International Institute of Management Science, India. He served as a Faculty Head of Computer Division of the Indian Institute of Material Management, Kolkata, India. He was an adjunct faculty of University of Redlands, California and Greenwich University, Norfolk Island. He served as a Principal Adviser, Software Design and Development of EDSA Micro Corporation., USA. As a corporate trainer he taught Managers, Engineers of Parsons Corporation, USA in Relational Database Management System (DBMS). He also provided training on courses of Computer and DBMS to Managers, Engineers of State Electricity Board, Kolkata, India, and Indian Administrative officers at Administrative training Institute, Kolkata, India. He is a Competent Toast Master (CTM) of Toast Master of International, USA. Dr. Ray was a senior member of IEEE, USA. He has a number of published papers to his credit. His primary interests are in teaching and research in the fields of Computer Science and Engineering, Management Information Systems, Computer Applications in Business Administration including Project Management, and Systems Analysis and Design.

### **Harvey Menden, Ph.D.**

#### **Dean, School of Business and Economic Development**

Dr. Menden is Director, Training and Organizational Development for a multi-billion dollar business. He previously held the position as a Senior Consultant for the Human Resources Organizational Capability Group at Amoco Corporation. He has provided services as either an employee or an external consultant to Fortune 500 companies such as The General Electric Company, The Coca-Cola Company, Black and Decker, Canada Life, and Little Tikes. He possesses extensive experience within Human Resources, Organizational Development, Organizational Behavior, International Business, and Adult Education. Dr. Menden is a member of the International Society for Performance Improvement (ISPI) and has previously served on the Atlanta chapter's board. He serves as adjunct faculty at Newport University. Dr. Menden received his Ph.D. in Business Education from International Institute for Advanced Studies, D.Min. from CBCS, an MBA from Newport University, and a BS in Political Science from the State University of New York.

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### **Kaliyappan P Renganathan, M.Sc.Res Deputy Director, Engineering Management**

Prof. Renganathan holds a Master of Science by Research from Asia eUniversity, Malaysia. He holds professional qualifications as a Certified Planning Engineer (CPE) from the American Academy of Project Management, USA and has studied in the Institute of Technology Butterworth to achieve his Diploma as an Electronic Technician. Prof. Renganathan has many years of industrial experience, specializing in automation and semiconductor assembly. He was employed at ASM Assembly Equipment as a senior service engineer before working with ASE Semiconductor Electronics as a senior process engineer. He has been involved with transfer molding as a key person to all molding processes and systems. Prof. Renganathan implemented process improvements and conducted effectiveness costs studies. Currently, he works as a Technical Sales Manager with Jademicron Pts. Ltd., promoting technical products for the semiconductor industry. Prof. Renganathan is a member of the International Association of Engineers and is a Fellow of the American Academy of Project Management.

### **Ismail Jamal, Ph.D.**

Ismail Jamal has vast and diversified experience in HRM and HRD after more than twenty-five years being exposed to the banking, finance, insurance, construction (infrastructure and heavy engineering), transportation and haulage, manufacturing and marine industries. He has wide exposure in dealing with unionized and non-unionized environments, and also governmental relations. He has conducted lectures and courses in established private colleges and higher institutions, presented papers in local and international conferences, and managed consulting assignments in established international conferences, and managed consulting assignments in established organizations. He has championed, participated, implemented and internalized initiatives such as HR Global Transformation, Employer of Choice, Performance Management, Change Management, Six-Sigma Program, Supply Chain Management, SAP R/3 HR Module and other HR reengineering management programs and processes. A graduate of MBA(HRD) from University of Hull, UK he is currently pursuing his Doctoral degree in Business Management focusing on *Profiling and Job Matching Using Web-based Technology* with UiTM Graduate School (IPSIS), Shah Alam, Selangor D.E. while being freelance Consultant for e-PROFILES SDM BHD, specializing in Human Capital Competencies, eProfiling and Job-Matching using 100 web-based assessment technology information systems and as Associate Consultant for Irshad Consulting.

## **ENTRY REQUIREMENTS**

Admission to the Bachelor of Science in Engineering Management requires a at minimum of two full years of study in the engineering field (60-90 completed credits preferred) and a current position and no less than seven years of progressively more responsible years of career experience in the engineering field. Students are required to successfully complete a supervised practicum prepare, a meaningful senior project, and a written and oral final examination in the fundamentals of engineering management .based upon independent research. To complement this rigorous academic training, students might cooperate with advanced technology companies in their research ventures.

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### **DEGREE REQUIREMENTS**

The prerequisite engineering coursework should encompass important themes from major engineering disciplines, such as mechanical, civil and electrical. Beyond the entry requirements including strong classwork in engineering, the Bachelor of Science in Engineering Management requires classes in financial management and accounting, and business management, engineering leadership, project analysis and project management, operations management, and quality control. Beyond the academic classwork in engineering management, students must complete the Practicum in Engineering Management, a Senior Project in Engineering Management, and a written and oral Final Examination in Engineering Management, to complete their program requirements. Note that students may make application to complete portfolio reviews and challenge examinations related to advance learning achieved from engineering related employment achievements. These credits required written submissions by the student with verification of prior accomplishments.

The following elements reflect the program expectations:

### **Bachelor of Science in Engineering management (Required: 120 credits minimum)**

#### Academic Classwork in Engineering and Related (90 credits minimum)

Engineering and Technology Classwork (60 credits transferable from recognized institution)

Related Academic Electives (30 credits transferable and portfolio assessment)

#### Academic Classwork in Management (18 credits completed at Akamai University)

TEM 404: Strategic Management (3 credits)

TEM 405: Financial Management (3 credits)

TEM 407: Project Management and Analysis (3 credits)

TEM 411: Engineering Leadership (3 credits)

TEM 412: Operations Management (3 credits)

TEM 413: Quality Control (3 credits)

#### Finishing Activities (12 credits completed at Akamai University)

TEM 489: Practicum in Engineering Management (3 credits)

TEM 480: Senior Project in Engineering Management (6 credits)

TEM 499: Final Examination in Engineering Management (3 credits)

### **COURSE MODULE DESCRIPTIONS**

#### **TEM 404: Strategic Management (3 credits)**

This course examines the strategic management process. Participants receive instruction in effectively establishing company direction, completing industry analyses, evaluation of company resources and competitive capabilities, strategic competitive advantages and strategic implementation. Topics examine business models and strategies, building resource strengths and organizational capabilities for the information age.

**TEM 405: Financial Management (3 credits)**

Participants are provided a financial management overview including accounting, cash management, ratio analysis, cost accounting, pricing ratio, planning and budgeting, and investment appraisal. The course module will also explore financial management issues for international business.

**TEM 407: Project Management and Analysis (3 credits)**

This module provides a survey of the essentials of project management and project analysis. Students will learn to examine the costs or problems related to a project before work on it is started. Overall topics explore strategic context of projects, project planning, controls, information systems, earned value management and project termination. Participants may also examine organizational design, organizing for project management, project authority and maturity; interpersonal dynamics, project leadership, communications and working with project teams; cultural considerations and continuous improvement, and a study of alternative teams and considerations for the future.

**TEM 409: Practicum in Engineering Management(3 credits)**

Master of Science in Engineering Management students are afforded the opportunity to carry out real-world projects in association with business and industry. Students are responsible for project y planning, execution, management, and client interactions. They conduct regular teleconferences and meetings with industrial or business sponsors to review project progress, and each project culminates in a final presentation to faculty supervisors in the delivery of a practicum report. Participants investigate core aspects of business and industry within the professional environment of engineering management through close contact with leadership in real world situations. Students pursue practicum through a supervised practice, apprenticeship, professional practice in a work situation, advanced field study or other external exploration under the direction of a qualified faculty mentor and an approved field site sponsor. Students participate in the practicum for a minimum of 50 contact hours. The field placement is expected to afford students appropriate practical hands on experience and in-depth knowledge of a specific area of engineering management. Students complete a journal and prepare a scholarly paper summarizing their findings for the practicum.

**TEM 411: Engineering Leadership (3 credits)**

This class is intended to introduce the basic concepts, theories, principles and practices of engineering leadership. It includes practice in effective written and oral communications via practice presentations. Topics may include engineering leadership characteristics, individual differences and self-awareness; developing and building teams; managing change, conflicts, and crises; and understanding real-world ethics and core values. These values may include the concepts of integrity, compassion, growth, curiosity, and determination and the application of leadership and management at the group and team level.

**TEM 412: Operations Management (3 credits)**

Firms are organized to provide goods and services to the public. Goods refer to manufactured, assembled and processed items. Goods are tangibles that can be produced before the actual use and inventoried. Services, on the other hand, are intangibles that cannot be inventoried. Services are provided at the time when the customers need them. The study of operations management

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(OM) is the study of operations and processes leading to the creation of goods and services. An operations manager is responsible for planning, organizing, coordinating and controlling organizational resources to produce desired goods and services; that is the subject matter of this course.

### **TEM 413: Quality Control (3 credits)**

This class will examine the details of the processes of strategic total quality management, quality assurance, quality control, vital elements of Six Sigma (and DFSS). This course familiarizes students with quality control techniques, quality assurance issues and quality management methods. It may focus upon quality assurance and quality control in new process design, substantial process re-design, and new product introduction.

### **TEM 480: Senior Project in Engineering Management (6 credits)**

The 3-credit Senior Project is undertaken at the completion of the undergraduate program. It is intended to provide the student with an opportunity to investigate an area of special interest within the academic concentration of Engineering Management, which has potential for advancing the student's profession development. The senior project takes the form of a scholarly paper of at least 15 double spaced typewritten pages with full and faithful referencing and citations to the literature which has informed the author.

### **TEM 489: Practicum in Engineering Management (3 credits)**

Undergraduate students investigate core aspects of the discipline within the professional development environment through close contact with practitioners and real world situations. Students may pursue the practicum through a supervised practice, apprenticeship, professional practice, advanced field study or other external exploration under the direction of a qualified mentor and an approved field site sponsor. Graduate students participate in the field study for a minimum of 45-50 contact hours per Akamai University semester credit. The field placement is expected to afford students appropriate practical hands on experience and in-depth knowledge of their professions. Students complete a daily journal and prepare a scholarly paper summarizing their findings for the field study.

### **TEM 499: Final Examination in Engineering Management (3 credits)**

Bachelor of Science students in Engineering Management complete this final examination as a required element of their academic program, after completing their Senior Project. The final examination includes both written and oral components and is confined to the program of management studies completed by the student at Akamai University.