

## **MT5002: Management of Industrial R&D**

Workload: 3-0-0-3-5

### **Description :**

The first part of this module will introduce the 3<sup>rd</sup> generation R&D practice which is used currently by successful industrial organizations. The strategic role of R&D in innovation, organisation issues in R&D and the evaluation of returns and risks will be presented. The second part of this module will introduce the emerging 4<sup>th</sup> generation R&D practice which will augment the current practice in addressing news issues due to discontinuous innovation, increasing importance of tacit knowledge and the need to embrace knowledge management in R&D.

### **Aims and Objectives:**

Students will learn the disciplines needed to systematically organize and manage R&D in a globalised high-tech organisation. In addition to learning current best practices, they will be exposed to the emerging need to incorporate knowledge management and new organisation design to cope with rapidly changing and discontinuous innovations.

### **Syllabus:**

1. Role of R&D In Innovation

Relations among research, development and technology; strategic role of R&D; the challenge of innovation.

2. Top Management and R&D

Purposeful R&D management; continuous and discontinuous innovation; Technology roadmapping; 4<sup>th</sup> generation R&D; role of CEO and CTO

3. Evaluation Returns, Risks, and Rewards

Principles for characterizing, assessing and managing value of R&D through the notion of technology options; integration of business and R&D strategies; case analysis of an industrial company; determining technological competitive position; the R&D portfolio.

4. Organising R&D for Results

Typical organization issues in R&D; towards the optimum structure; managing for results; getting the most out of your people.

5. Competitive Architecture : The External Framework

Architecture and capability development; defining customer value in a discontinuous market; dominant design; product, service and process innovation; the innovation cycle: architecture, capability, platforms and products; case study of Xerox Docu Tech.

6. Organization Capability : The Internal Framework

Information, knowledge and capability; learning and wisdom; tacit and explicit knowledge; communities of practice.

7. The Knowledge Channel and Market Development

Market research for discontinuous innovation; the knowledge channel; market development ; point of use and the internet; managing knowledge assets.

8. Organizational Architecture

Organization design and asset management; sustaining and disruptive innovations; the new organization: delayering and relayering; the Chief Innovation Officer.

9. Organizational Capability Development

Improving productivity on many levels; strategies for improving; measuring and managing the maturity of capability; executive time; future enacting; learning how to learn; from 3<sup>rd</sup> to 4<sup>th</sup> generation R&D; the innovation business process map.

8. Open Innovation

The open innovation paradigm for managing industrial R&D; managing external R&D in conjunction with internal R&D; harnessing research of universities and research institutes.

**Assessment:**

CA: 60%

Final Exam: 40%

**Modes of Teaching and Learning:**

Lectures, case studies, assignments

**References:**

1. Philip Rousset, Kamal Saad and Tamara Erikson, "Third Generation R&D", Harvard Business School Press, 1991.
2. William Miller and Langdon Morris, "Fourth Generation R&D", John Wiley & Sons.
3. Henry Chesbrough, Open Innovation, Harvard Business School Press, 2003.