750791, Fundamentals of Scientific Research

3 hour per week, 3 credit hours, prerequisite: **none**

Teaching Method: 15 hours Lectures (1 hour per week)

Aims: This module aims to offer a grounding in various aspects of research and project management, from the most theoretical (philosophy of science), through the subject-specific (how to choose, refine and develop a research topic), to practical advice on undertaking research, including how to contribute to research, manage research projects, cope with the day-to-day research activity, etc. It covers material and advice on technical writing for the dissertation. Research seminars undertaken as part of the Research Project contribute to this module. The module also covers various aspects of Professional Skills as required in the IT industry and in Research and Development. The skills include team-work skills, industrial problem-solving, leadership skills, communication skills, presentation skills and preparation for job application and interview skills.

Learning Outcomes:

On completion of this module, the student should:

• Be prepared to undertake the Research Project, having been introduced to

the skills and knowledge necessary to undertake the project.

• Have presented a research seminar to an audience of researchers.

• Have been prepared for some of the demands of, and skills required for,

work in IT and IT-related industries.

Textbooks and Supporting Materials:

Lecture notes will be provided and guidance on suitable literature.

Synopsis:

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1- Research Skills and MSc project management: Introduction to research in science; Research methods and Creative thinking; Management of the MSc project, including managing the academic year, relationship with supervisor and interaction with research groups; Requirements of an MSc

research project; Research presentations; Requirements of a good dissertation; Technical writing skills; Compare and contrast the scientific approach with other ways of obtaining knowledge and understand how the methods differ with regard to causality and generalizability; Compare the major research designs and discuss the strengths and weaknesses of each; Articulate the advantages of the scientific approach to practice; Define basic statistical terms and concepts, and discuss the concepts of measurement, sampling and data collection;

2- Explain how the scientific approach may be affected by ethics, and issues relating to diversity, minority status or oppression; Describe how the scientific approach can be used to test the efficacy of scientific research/projects; Design and conduct a study intended to improve practice.

3- Employ appropriate professional journal styles and formats when writing. Objectively critique published studies in scientific literature.

Assessment: There is no formal assessment for this module, but active participation is required, and

students will need some of the material to succeed in the Research Project. The research seminar is required to be assessed to provide feedback on performance.