Telecommunications Engineering Department
Yarmouk University
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Demand Analysis of Master Programs in Telecommunications Engineering and Management

Report

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Preface

This report summarizes the activities and results achieved through the demand analysis for the proposed Master programs at the Telecommunication Engineering Department at Yarmouk University. The Demand Analysis is part of the activities of the Tempus project No. 511074 which was awarded to the university in July 2010.

The objective of the Demand Analysis is to survey the needs of telecommunications industries in Jordan regarding qualified engineers. It aims to understand the competencies and skills required in the area of telecommunications engineering in order to design Masters Programs that can meet market demand. In addition the results will help identify the contents and structure of these programs.

Through the surveys and meetings conducted by the Demand Analysis Work Group in a span of about 6 months, a demand analysis was realized as a report (this report) which highlights the main characteristics of potential new programs suggested to fill the gaps in the market.

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Executive Summary

This report contains the results of the demand analysis of the telecommunications sector in Jordan for new Master programs in Telecommunications Engineering. This analysis is a part of the activities of the Tempus project No. 511074 which was awarded to the Telecommunications Engineering Department at Yarmouk University in July 2010 and aims to reform the existing Master program.

The Telecommunications sector in Jordan is one of the fastest growing sectors in Jordan and contributes to the gross national product and the employment of manpower. Due to fast advances in the technologies used in this sector, telecom companies seek to recruit qualified engineers who are well educated and up-to-date in their knowledge. The education and skills of technical staff is vital for the survival of these companies.

The objective of the demand is to understand the needs of this sector and to identify contents of Masters Study programs that will be offered enhance knowledge and competencies of the technical staff. To achieve this objective, a survey was designed and disseminated among telecommunications companies in Jordan. The questionnaire aims to collect data about telecommunication industries in Jordan, technologies used, needed skills, employability of graduates, and how Masters degrees in Telecommunication Technology and Telecommunication Management can improve competencies of telecommunications engineers.

A sample of about 200 questionnaires were distributed and collected. The obtained data were statistically analyzed and inferences were made about contents and structure of proposed Masters Programs.

Main results of the demand analysis indicate first; that there is an overwhelming need to introduce new Masters degrees in telecommunications engineering tailored toward improving technical and managerial skills and knowledge for engineers working in this sector. Second; the most important topics needed in these Master degrees were identified, and finally, the way these programs should be offered to suit the working conditions of these engineers was recognized.

Chapter 1
Introduction

The existing Masters program offered by the Telecommunications Engineering Department at Yarmouk University was started in 2004 and offers a Masters of Science (M.Sc.) degree in Wireless Communications. The program admits students who have a B.Sc. degree in Telecommunications Engineering or related disciplines. The program is operated by 17 faculty members most of which are PhD holders and have relevant academic experience.

The curriculum of this program was developed by the Department staff in 2003 and was approved by the Jordan Ministry of Higher Education (MOHE). The curriculum development was based on a survey of similar programs in Jordan, the EU and the USA, and was guided by program specifications mainly prescribed by both Ministry of Higher Education (MOHE) and the Department standards. These standards consist of a detailed list of necessary subjects, course contents and associated contact hours. Hence, the curriculum development process was input driven and the curriculum was based on compulsory core curricula expressed by core subjects, plus a variety of elective subjects that allow enhancement of the outcomes of the program.

1.1 The Telecommunications Engineering Department at YU

The Telecommunications Engineering Department at Yarmouk University was established in 1989. Located in the city of Irbid, Jordan, the department plays a vital role in providing the market of local and regional industries with high level engineering graduates. The Department offers both B.Sc. and M.Sc. degrees in Telecommunications Engineering and Wireless Communications Engieering. These programs are operated by 17 faculty members, of whom 90% are PhD holders. The offered programs attract outstanding students from Jordan and neighboring countries with an average class of around 150 per annum. Currently, there are around 850 students (800 at B.Sc. level and 50 at M.Sc. level) of which approximately 10% are from neighboring countries. The number of graduates has exceeded 2000 engineers who enjoy a high employability rate in Jordan and the region. As well as this, the Department has distinguished itself by offering a training program for students that provides them with a "live" experience in leading companies in Jordan and abroad, which provided strong industry ties for the faculty members as well as enhanced employment opportunity for its graduates.

The current curriculum is focused on improving academic knowledge and prpare its students to pursue their higher studies toward a Phd degree. However a ahortcomeing of this program is that it is based academic opinion and did not consider the needs of the local and regional telecommunications market.

1.2 The Proposed Programs

The Tempus project at the Department is intended to result in the reform of the existing M.Sc. program in Wireless Communications and the development of two new Masters programs, namely:

- Masters of Engineering in Telecommunications Technology
- Masters of Engineering in Telecommunication Management.

The two newly proposed program aim at improving managerial and technical skills of telecommunications engineers and provide them with necessary competencies to be successful and contribute to the success of their companies.

Potential competencies that might be offered in the proposed programs were ifdentified through several activities that were previously conducted since the launch of the Tempus project. These activities include:

i. Meetings with telecomminications industry represntatives. During the "Review of Existing Curriculum " deliverable.
ii. Through the Competition anlysis (Deliverable No. 2); data were collected regarding MBA nad Telecommunications Masters programs offered by other universitiies and it was possible to outline the main contents and attributes of such programs.
iii. Through an Industrial workshop conducted to disseminate the project activities and collect feedback about needs of industrial sector.

A. Masters of Engineering in Telecommunications Management

Many engineers from Telecom companies choose to join MBA programs in order to improve their managerial, personal, and analytical skills. These skills, in addition to technical competencies are necessary to progress in their career path.

The objective of the Telecommunication Management program is to prepare students to be managers in telecommunication business environments. This program will be designed to fill the gap in the market by offering a study program that provide students with knowledge in both telecommunications engineering and business administration disciplines, which are needed to progress in the telecom business industry. This program will target engineers working in the telecom industry, as well as fresh graduates who seek to improve their management and technical skills.

The following topics were considered in the Demand analysis and studied through the questionaire to identify the contents of a Masters of Engineering in Telecommunications Management:

- Competition and regulation issues
- Management of Telecom Network
- Service flow and logic
- Soft skills: communication and negotiation, marketing, strategic thinking
- Knowledge on future telecom industries
- Language skills – English
- Management, project management, team management
- Regulations and policies
- Financial and admin management
- IT and computer skills
- Telecom market knowledge
- Organization theory and how to develop market creativity
- Planning and optimization
- Research methodology
- Human Resource Management
- Total Quality Management
- Accounting, Economics, Finance
- Entrepreneurship
- Business Technology Strategy
- Marketing and Financial Management

B. Masters of Engineering in Telecommunications Technology

The objective of this program is to provide students with the technical and professional skills needed for work successfully in the technical side of the telecommunications business, including the technical knowledge on latest telecommunications technology, as well as relevant legacy technology. Courses offered by this program should focus on practical aspects of telecommunications

technology and not on engineering science. The following are suggested list of topics which will be considered in the curriculum development stage of this program:

- Mobile Communications Technology,
- Wireless Network Technology,
- Microwave and RF technology,
- Antenna technology,
- Entrepreneurship,
- Digital broadcasting,
- Business technology strategy,
- Planning and optimization,
- Project management,
- Regulations and policies of telecom services.
- Switching Technology

1.3 The Demand Analysis

The main objective of the Tempus project is to modernize the existing Master of Science program in Wireless Communications at the department and introduce new tracks that provide strong linkage to local and regional industries and contribute to providing international recognition for our programs in the area of wireless communications.

The project consists of a number of activities, which will be conducted over a period of 3 years and range from review of the existing curricula to the establishment of new programs and building capacity at the Department. The project consists of 28 deliverables grouped under a number of work packages as shown in Table 1.1.

Table 1.3 : Tempus project work packages and deliverables.

WP No.	WP Type	Del No.	Deliverable Title
WP.1	Development	1	Review of Existing Curriculum
WP.2	Development	2	Competition Analysis
WP.2	Development	3	Demand Analysis
WP.2	Development	4	Local Market Needs
WP.3	Development	5	Visits of Jordanian Partner Academic staff to EU
WP.3	Development	6	EU Educational System Seminar
WP.4	Development	7	Professional Development of Local Academic Staff
WP.4	Development	8	Fully Prepared Curriculum Drafts
WP.4	Development	9	Fully Prepared Course Material
WP.4	Development	10	Curriculum Drafts Finalized
WP.5	Development	11	Student Selection Criteria Implemented
WP.5	Development	12	Student Evaluation Process Implemented
WP.5	Development	13	Courses Taught by Local Staff
WP.6	Quality plan	14	Quality Control Plan
WP.6	Quality plan	15	Information System for QC of Curriculum
WP.6	Quality plan	16	Progress Reports
WP.6	Quality plan	17	Budget Review
WP.7	Management	18	Memorandum of Understanding
WP.7	Management	19	Coordination Meeting
WP.7	Management	20	An Electronic Database

WP.8	Dissemination	21	An Informative Web site
WP.8	Dissemination	22	New Program Features Disseminated
WP.8	Dissemination	23	Students Recruitment
WP.9	Exploitation	24	Curriculum Approval and Accreditation
WP.9	Exploitation	25	Collaboration with Local Telecom Industry
WP.9	Exploitation	26	A network of Collaboration with EU institutions
WP.9	Exploitation	27	Quality Control Unit
WP.9	Exploitation	28	Lab Equipment

This report describes the activities and outcomes of the Demand Analysis "deliverable 3". The Demand Analysis consists of developing a questionnaire to understand the market needs. This questionaire was disseminated among industrial firms and individuals in the telecommunicarions sector in Jordan. Responses from 150 participants were collectes and statistical analysis were performed to withdraw infrences about competencies needed to design Masters programs in Telecommunications Technology and Telecommunication Management. The descriptions of Deliverable 3 as stated in the project proposal:

Description of Deliverable 3

"A questionnaire will be developed and disseminated among telecommunications engineers working in industry, industry managers and graduate students in Jordan. The questionnaire will be used to collect statistical data on the employability of graduates, the required skills and knowledge of graduates and the openings at local industries available for graduates per year. The data will be gathered in a report to be used by the curriculum development process."

The objectives of the Demand Analysis can be summarized as follows:

1. To understand telecommunications industry needs.
2. To provide Master degrees related to communications engineering at the highest international standards.
3. To enhance student learning outcomes and skills to meet local market needs and international best practices through the building of technical capacity at YU and local partner institutions.

The Demand Analysis is expected to result in the following outcomes:

1. Better understanding of the market needs.
2. Contribute to the curriculum development of two Master program tracks: Telecommunications Technology and Telecommunication Management.
3. Develop a study program structure and contents that can help market needs
4. Developing intellectual skills such as critical thinking, ability to solve problems, quantitative and qualitative skills.
5. Suggest contents, outcomes, study length, and location of the proposed Masters degrees.