



Course Specification

Course Name:[Communication Technology]

Course Code:[IT321]

I. Basic Course Information

Major or minor element of program:[Both Major & Minor]

Department offering the course:[Information Technology Department]

Academic level:[400 Level]

Semester in which course is offered:[First (fall) Semester]

Course pre-requisite(s): [Data Communication [IT 221]]

Credit Hours: 3

Contact Hours Through:

Lecture	Tutorial*	Practical*	Total
2.5	0.0	1.5	4.0

* 1.5 hours for **either** Tutorial or Practical

Approval date of course specification:[September 2014]

II. Overall Aims of Course

[This course focuses on the core technologies used in designing various types of communication systems. It introduces students to the main principles of current and emerging technologies used in wireless and optical communication systems. In addition, it introduces students to the building blocks and architecture of next-generation optical networks.]

III. Program ILOs covered by course

Program Intended Learning Outcomes (By Code)			
Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
[K1,K6,K17,K23]	[I5,I9,I13,I15]	[P5,P9,P13,P18]	[G1,G4,G5,G9]



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IV. Intended Learning Outcomes of Course (ILOs)

a. Knowledge and Understanding

On completing the course, students should be able to:

- K.1 List the benefits as well as the limitations of optical networks.
- K.2 Explain the different building blocks of an optical network and the underlying technologies related to these building blocks.
- K.3 Illustrate the current underlying technologies of next-generation communication networks.
- K.4 Show essential concepts, principles of signal transmission over optical fiber.
- K.5 Demonstrate an in-depth understanding of the fundamental concepts and issues related to the design of WDM optical networks.]

b. Intellectual/Cognitive Skills

On completing the course, students should be able to:

- I.1 Develop and defend logical arguments related to various communication technologies.
- I.2 Differentiate between the different types of WDM optical networks.
- I.3 Evaluate the current state of art of the different components in an optical network.
- I.4 Design, at high-level, parts of a communication system for a given set of requirements.
- I.5 Assess the tradeoffs among the different design issues of optical switching networks.]

c. Practical/Professional Skills

On completing the course, students should be able to:

- P.1 Use of advanced network simulators adopted in telecom industry.
- P.2 Develop good understanding of how to select among various network design options to best meet the requirements of a specific problem.
- P.3 Develop good understanding of various WDM networks types and switching techniques.
- P.4 Apply research skills, through the use of online resources, technical repositories and library-based material.
- P.5 Measure communication technologies efficiency and effectiveness in terms of their quantitative and qualitative properties.]

d. General and Transferable Skills

On completing the course, students should be able to:

- G.1 Demonstrate independent critical thinking and problem solving skills.
- G.2 Develop the ability to professionally criticize arguments on a scientific basis.
- G.3 Search and acquire knowledge from external resources.
- G.4 Demonstrate ability in report technical writing skills.
- G.5 Show the ability to identify, understand, and present the quantitative dimensions of various issues related to the analysis and design of communication technologies.]



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V. Course Matrix Contents

	Main Topics / Chapters	Duration (Weeks)	Course ILOs Covered by Topic (By ILO Code)			
			K & U	I.S.	P.S.	G.S.
1-	Basic concepts of communication systems]	[1]	[K1]	[]	[]	[]
2-	Basic Concepts of SONET/SDH networks]	[1]	[K1]	[]	[P4]	[G3,G4]
3-	Optical transmission systems and technologies]	[2]	[K1,K4]	[I3]	[P1,P5]	[G1,G5]
4-	Introduction to WDM systems]	[1]	[K2]	[I2]	[P2]	[G2]
5-	Building blocks of WDM systems]	[2]	[K2,K3]	[I3]	[P2]	[G2]
6-	Evolution of WDM networks]	[1]	[K3]	[I1]	[P2,P3,P5]	[]
7-	WDM backbone networks]	[1]	[K3]	[I2,I4]	[P3]	[G3]
8-	WDM switching types and techniques]	[2]	[K5]	[I1,I4,I5]	[P3,P4]	[G1,G2,G3,G4]
9-	Optical access networks: current access technologies and PON]	[2]	[K5]	[I1,I4]	[P2]	[G2,G3]
10-	Optical access networks: E-PON, G-PON, and WDM-PON]	[]	[K3,K5]	[]	[]	[]
	Net Teaching Weeks	13				

VI. Course Weekly Detailed Topics / hours / ILOs

Week No.	Sub-Topics	Total Hours	Contact Hours	
			Theoretical Hours	Practical Hours*
1	Basic concepts of communication systems]	[2.5]	[2.5]	
2	Concepts of SONET/SDH networks]	[4]	[2.5]	[1.5]
3	Optical transmission systems and technologies: attenuation, dispersion, non-linearity, fiber cables, lasers,]	[4]	[2.5]	[1.5]
4	Optical transmission systems and technologies: transmitters, receivers, filters]	[4]	[2.5]	[1.5]
5	Introduction to WDM systems]	[4]	[2.5]	[1.5]
6	Building blocks of WDM systems]	[4]	[2.5]	[1.5]
7	Midterm Exam			
8	Building blocks of WDM systems]	[4]	[2.5]	[1.5]
9	Evolution of WDM networks]	[4]	[2.5]	[1.5]
10	WDM backbone networks]	[4]	[2.5]	[1.5]
11	WDM switching types and techniques: OCS, OPS]	[4]	[2.5]	[1.5]



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12	[WDM switching types and techniques: OPS, OBS]	[4]	[2.5]	[1.5]
13	[Optical access networks: current access technologies and PON]	[4]	[2.5]	[1.5]
14	[Optical access networks: E-PON, G-PON, and WDM-PON]	[4]	[2.5]	[1.5]
15	Final Exam			
Total Teaching Hours		57	39	18

* No Practical/Tutorial during the first week of the semester

VII. Teaching and Learning Methods

Teaching/Learning Method	Selected Method	Course ILOs Covered by Method (By ILO Code)			
		K & U	Intellectual Skills	Professional Skills	General Skills
Lectures & Seminars	X	All	All	P2,P3,P5	G1,G2,G5
Tutorials					
Computer lab Sessions	X	K2,K3,K4	I1,I3,I5	P1,P2,P5	G2,G4,G5
Practical lab Work					
Reading Materials	X	All	All	P2,P3,P4	G1,G2,G3
Web-site Searches	X	All	I1,I3,I5	P4	G3,G4
Research & Reporting					
Problem Solving / Problem-based Learning					
Projects					
Independent Work					
Group Work					
Case Studies					
Presentations					
Simulation Analysis					
Others (Specify):					

VIII. Assessment Methods, Schedule and Grade Distribution

Assessment Method	Selected Method	Course ILOs Covered by Method (By ILO Code)				Assessment Weight / Percentage	Week No.
		K & U	I.S.	P.S.	G.S.		
Midterm Exam	X	[k1,k2,k4]	[I1,I3,I5]	[P2,P4,P5]	[G1,G2,G3,G5]	[20%]	7
Final Exam	X	[All]	[All]	[P2,P3,P4,P5]	[G1,G2, G5]	60%	15
Quizzes	X	[All]	[I1,I2,I3,I5]	[P2,P3,P4,P5]	[G1,G2,G3,G5]	[10%]	
Course Work							
Report Writing	X	[All]	[All]	[All]	[All]	[10%]	[Every week]
Case Study Analysis							



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Oral Presentations	[[]]	[[]]	[[]]	[[]]	[[]]	[[]]	[[]]
Practical	[[]]	[[]]	[[]]	[[]]	[[]]	[[]]	[[]]
Group Project	[[]]	[[]]	[[]]	[[]]	[[]]	[[]]	[[]]
Individual Project	[[]]	[[]]	[[]]	[[]]	[[]]	[[]]	[[]]
Others (Specify):	[[]]	[[]]	[[]]	[[]]	[[]]	[[]]	[[]]

IX. List of References

Essential Text Books	• [Biswanath Mukherjee. Optical WDM Networks. Springer, 2006]
Course notes	• [None]
Recommended books	• [F. K. Hwang: The mathematical theory of nonblocking switching networks. World Scientific, 1998. • R. Ramaswami and K.N. Sivarajan: Optical networks: a practical perspective, 2nd Ed. Academic Press, 2002. • T.E. Stern and K. Bala: Multiwavelength optical networks a layered approach. Addison Wesley, 1999.]
Periodicals, Web sites, etc ...	• [None]

X. Facilities required for teaching and learning

<ul style="list-style-type: none"> • [Data Show • White Board • Simulation Software • Computer Lab]
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Course coordinator: [Ass. Prof. Haitham S. Hamza]

Head of Department: Prof. Reda Abd el-Wahab

Date:[September 2014]