



Course Specification

Course Name:[Virtual Reality]

Course Code:[IT431]

I. Basic Course Information

Major or minor element of program: Major

Department offering the course:[Information Technology Department]

Academic level:[400 Level]

Semester in which course is offered:[Second (Spring) Semester]

Course pre-requisite(s): [Computer Graphics– 1 (IT 331)]

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:January 2015

II. Overall Aims of Course

[The objective of the course is to understand what is virtual reality (VR), how to design virtual reality system and recognize different virtual reality applications.]

III. Program ILOs covered by course

Program Intended Learning Outcomes (By Code)			
Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
[K1,K11,K17,K20]	[I1,I12,I19]	[P14,P15,P17,P18]	[G2,G7,G8]



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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 Understand essential concepts, principles, theories, current and future development for computing, information, and decision support disciplines.
- K.2 Demonstrate an understanding of the fundamental concepts, tools, and techniques used for processing various multimedia information including signal processing, pattern recognition, and speech and processing.
- K.3 Identify the important characteristics of different virtual reality techniques.
- K.4 Apply advanced computer graphics and computer vision to design virtual reality applications.]

b. Intellectual/Cognitive Skills

On completing the course, students should be able to:

- I.1 Analyse problems and assess the relevance and adequacy of information, set goals towards solving them, and formulate the necessary systems requirements.
- I.2 Develop innovative, effective and practical designs to solve real-life IT-related problems with identified specifications and constraints.
- I.3 Compare and select the appropriate design solution among the proposed designs and their expected results.]

c. Practical/Professional Skills

On completing the course, students should be able to:

- P.1 Apply the principles of effective information management, organization, and presentation to information retrieval of various kinds, including text, images, sound, and video, resolving security issues.
- P.2 Design, implement, maintain, document, and manage software, using appropriate tools, through the acquired comprehensive computing knowledge and skills to solve practical problems.
- P.3 Manipulate real life problems using different modelling approaches.
- P.4 Employ publicly available software (such as APIs or open source software) to solve problems.
- P.5 Apply skills gained through the course to design a virtual reality application.]

d. General and Transferable Skills

On completing the course, students should be able to:

- G.1 Demonstrate ability in time management, organization skills, communication skills, report writing skills, and presentation skills for a variety of audiences (e.g., management, technical, academic).
- G.2 Demonstrate ability to work as a team member.
- G.3 Use IT resources and general computing facilities efficiently.
- G.4 Demonstrate an appreciation and ability to continue professional development and ensure life-long self-learning.]



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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-	Introduction	[1]	[K1,K2]	[]	[]	[]
2-	Virtual Reality Input Devices	[1]	[K1,K2]	[]	[]	[]
3-	Virtual Reality Output Devices OpenGL Introduction – 2D drawing – Shading	[2]	[K1,K2]	[I1]	[P2]	[]
4-	Computing Architectures for Virtual Reality OpenGL Introduction – 2D drawing – Shading	[2]	[K2,K3]	[I1]	[P2]	[]
5-	Modelling OpenGL 3D drawing – Animation – Texture mapping – Lights	[1]	[K3,K4]	[I1,I2,I3]	[P2,P4]	[]
6-	Virtual Reality Programming OpenGL 3D drawing – Animation – Texture mapping – Lights	[2]	[K3,K4]	[I1,I2,I3]	[P2,P4,P5]	[]
7-	Human Factors in Virtual Reality Work in OpenGL Project	[1]	[K3,K4]	[I1,I2,I3]	[P1,P4,P5]	[G1,G2,G3]
8-	Traditional Virtual Reality Applications Work in OpenGL Project	[1]	[K4]	[I1,I2,I3]	[P4,P5]	[G1,G2,G3]
9-	Emerging Applications of Virtual Reality	[1]	[K4]	[I1,I2,I3]	[P5]	[G3,G4]
10-	3D sound	[1]	[K1,K2]	[I1]	[]	[]
	Net Teaching Weeks	13				

VI. Course Weekly Detailed Topics / hours / ILOs

Week No.	Sub-Topics	Total Hours	Contact Hours	
			Theoretical Hours	Practical Hours*
1	(Lecture) Introduction	[2.5]	[2.5]	
2	(Lecture) Virtual Reality Input Devices	[4]	[2.5]	[1.5]
3	(Lecture) Virtual Reality Output Devices (Lab) OpenGL Introduction	[4]	[2.5]	[1.5]
4	(Lecture) Computing Architectures for Virtual Reality (Lab) OpenGL 2D drawing	[4]	[2.5]	[1.5]
5	(Lecture) Computing Architectures for Virtual Reality (Lab) OpenGL Shading	[4]	[2.5]	[1.5]
6	(Lecture) Modelling (Lab) OpenGL 3D drawing	[4]	[2.5]	[1.5]



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Midterm Exam				
7				
8	(Lecture)Virtual Reality Programming (Lab) OpenGL Animation]	[4]	[2.5]	[1.5]
9	[Lecture)Virtual Reality Programming (Lab) OpenGL Texture mapping]	[4]	[2.5]	[1.5]
10	[Lecture)Virtual Reality Programming (Lab) OpenGL Lights]	[4]	[2.5]	[1.5]
11	(Lecture)Human Factors in Virtual Reality (Lab) Work in OpenGL Project]	[4]	[2.5]	[1.5]
12	(Lecture)Traditional Virtual Reality Applications (Lab) Work in OpenGL Project]	[4]	[2.5]	[1.5]
13	[Lecture) Emerging Applications of Virtual Reality]	[4]	[2.5]	[1.5]
14	[3D sound]	[4]	[2.5]	[1.5]
Final Exam				
15				
Total Teaching Hours		51	33	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]	[K1:K4]	[I1,I2,I3]	[]	[G4]
Tutorials	[]	[]	[]	[]	[]
Computer lab Sessions	[x]	[K4]	[I1]	[P1,P2,P3]	[G4]
Practical lab Work	[x]	[K3]	[I2,I3]	[P2,P3,P4,P5]	[]
Reading Materials	[]	[]	[]	[]	[]
Web-site Searches	[]	[]	[]	[]	[]
Research & Reporting	[]	[]	[]	[]	[]
Problem Solving / Problem-based Learning	[]	[]	[]	[]	[]
Projects	[]	[]	[]	[]	[]
Independent Work	[]	[]	[]	[]	[]
Group Work	[x]	[]	[I1,I2,I3]	[]	[G1,G2,G3]
Case Studies	[]	[]	[]	[]	[]
Presentations	[x]	[]	[]	[P2,P5]	[G1,G2,G3]
Simulation Analysis	[]	[]	[]	[]	[]
Others (Specify):	[x]	[VR Sites visits]			
		[]	[]	[]	[]



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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]	[I1,I2]	[]	[]	[20%]	7
Final Exam	[x]	[K1:K4]	[I1,I2,I3]	[]	[G4]	60%	15
Quizzes	[x]	[K1,K2]	[]	[P1]	[]	[5%]	[5]
Course Work	[]	[]	[]	[]	[]	[]	[]
Report Writing	[]	[]	[]	[]	[]	[]	[]
Case Study Analysis	[]	[]	[]	[]	[]	[]	[]
Oral Presentations	[x]	[K3]	[]	[P2,P3,P4,P5]	[G1,G2,G3]	[5%]	[5]
Practical	[]	[]	[]	[]	[]	[]	[]
Group Project	[x]	[K4]	[I2,I3]	[P2,P4,P5]	[G1,G2,G3,G4]	[10%]	[12]
Individual Project	[]	[]	[]	[]	[]	[]	[]
Others (Specify):	[]	[]	[]	[]	[]	[]	[]

IX. List of References

Essential Text Books	• [Grigore Burdea and Philippe Coiffet, "Virtual Reality Technology: 2nd Edition," Wiley, New York, ISBN 0471360899 © Wiley, 2003.]
Course notes	• [Sites.google.com/site/dreidemary]
Recommended books	• [None]
Periodicals, Web sites, etc ...	• [http://www.caip.rutgers.edu/vrtechnology/resources/public/LectureNotes/]

X. Facilities required for teaching and learning

[List the facilities required • Virtual Reality Lab]
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Course coordinator:Dr. Eid Emary

Head of Department:Prof. Hesham El Mahdy

Date: [January 2015]