ASSIUT UNIVERSITY



2023-2024





Faculty of Computers and Information

Dept. of Multimedia





Assiut University

Faculty of Computers & Information

Multimedia Undergraduate Program

(Credit Hours System)

2023-2024



Assiut University Faculty of Computers & Information Department of Multimedia Quality Assurance Unit



MM Undergraduate Program

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Assiut University

Faculty of Computers & Information

Department of Multimedia

Quality Assurance Unit



MM Undergraduate Program Specifications

A. Basic Information

- 1. Program Title: Multimedia
- 2. Program Type: Single
- 3. Faculty (Faculties): Faculty of Computers and Information
- 4. Department: Multimedia
- 5. Assistant Coordinator: Prof. Dr. Khaled Fathi Hussain
- 6. Coordinator: Prof. Dr. Khaled Fathi Hussain
- 7. Last date of program specifications approval: 2023-2024

B. Professional Information

1. Program Aims

The program aims to provide the student with both breadth and depth of knowledge in the concepts and techniques related to the design, programming, and application of multimedia systems. Specifically, based on the constitutions of the Computing Curricula (ACM/IEEE) out MM program aims to provide the student with:

- I. Multimedia System-level perspective.
- II. Appreciation of the interplay between theory and practice.
- III. Familiarity with common principles.
- IV. Significant project experience.
- V. Attention to rigorous thinking.
- VI. Adaptability.
- VII. Professionalism.
- VIII. Interpersonal skills.

2. Graduate attributes

The multimedia program is designed to provide the student with the foundations of the discipline as well as the opportunity for specialization. After successfully completing the multimedia program, the graduate should be able to:

- **I.** Development of the ability to recognize problems that is amenable to multimedia systems, and knowledge of the multimedia tools necessary for solving such problems.
- **II.** Understand fundamentals of image and video processing, audio processing, graphics, animation, interactive multimedia, databases, and network.



- **III.** Implement solutions, including use of appropriate programming languages and multimedia software tools.
- **IV.** Apply knowledge, skills, and applications of appropriate mathematical techniques, methods, and tools in multimedia.
- **V.** Specify, design, and implement multimedia systems, and evaluate them in terms of general quality attributes and possible tradeoffs presented within the given problem.
- **VI.** Apply multimedia solutions to functional, inter-organizational, operational, managerial, and executive problems and opportunities.
- **VII.** Describe characteristics of various components of multimedia systems, use the appropriate tools and techniques to analyze, design, and construct information systems.
- VIII. Communicate effectively by oral, written and visual means.
 - IX. Work effectively as an individual and as a member of a team.
 - **X.** Perform independent and efficient time management.
 - **XI.** Aware of key ethical issues affecting multimedia systems and their responsibilities as multimedia professionals.

3. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

On successful completion of the program, graduates should be able to:

- a1. Understand the essential mathematics relevant to computer science and multimedia.
- a2. Understand high-level programming languages.
- a3. Demonstrate basic knowledge and understanding of a core of mathematical analysis, algebra, applied mathematics and statistics.
- a4. Interpret data qualitatively and/or quantitatively.
- a5. Know and understand the principles and techniques of a number of application areas informed by the research directions of multimedia.
- a6. Show a critical understanding of the principles of artificial intelligence, image, and pattern recognition, computer vision and Human computer Interaction.
- a7. Understand the fundamental topics in computer systems, including hardware architectures and operating systems.
- a8. Select advanced topics to provide a deeper understanding of some aspects of objectoriented analysis and design, and software engineering.
- a9. Select advanced topics to provide a deeper understanding of some aspects of the artificial intelligence, image processing, and computer graphics and animation.
- a10. Demonstrate strong knowledge of fundamentals of programming and the construction of computer-based systems.
- a11. Provide a deeper understanding of legal, professional and moral aspects of the exploitation of computing.
- a12. Know the tools, practices and methodologies used in the specification, design, implementation and critical evaluation of multimedia systems.
- a13. Know the methods used in defining and assessing criteria for measuring the extent to which a computer system is appropriate for its current deployment and future evolution.
- a14. Know the current and underlying technologies that support computer processing and inter-computer communication.
- a15. Understand of the principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.

b. Intellectual Skills

On successful completion of this program, graduates should be able to:

b1. Discuss traditional and nontraditional problems, set goals towards solving them, and observe results.

- b2. Compare between (methods, techniques...etc).
- b3. Apply classifications of (data, results, methods, techniques... etc.).
- b4. Analyze attributes, components, relationships, patterns, main ideas, and errors.
- b5. Summarize the proposed solutions and their results.
- b6. Restrict solution methodologies upon their results.
- b7. Establish criteria, and verify solutions.
- b8. Show a range of solutions and critically evaluate and justify proposed design solutions.
- b9. Analyze computer science problems with pressing commercial or industrial constraints.
- b10. Generate an innovative design to solve a problem containing a range of commercial and industrial constraints.
- b11. Create and/or justify designs to satisfy given requirements (synthesis, evaluation, application).
- b12. Apply the concepts, principles, theories and practices underpinning computing as an academic discipline.
- b13. Apply knowledge and methods from a variety of sources
- b14. Analyze requirements of information manipulation and communication problems and design solutions based around appropriate integration of multimedia, Internet and computer software technologies
- b15. Plan, conduct and report on a program of work covering multiple system lifecycle stages and leading to an end-product, with evaluation of the end-product, and the process and technologies employed.
- b16. Synthesize ideas, proposals and designs effectively using rational and reasoned arguments for presentation to a range of audiences.
- b17. Correlate the results of tests to investigate the functionality of computer systems.

c. Professional and Practical Skills

On successful completion of this program, graduates should be able to:

- c1. Use appropriate programming languages and design methodologies.
- c2. Use appropriate web-based systems, tools and design methodologies.
- c3. Specify, design, and implement computer-based systems.
- c4. Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds, including text, images, sound, and video.
- c5. Apply the principles of human-computer interaction to the evaluation and construction of a wide range of materials including user interfaces, web pages, and multimedia systems.
- c6. Deploy effectively the tools used for the construction and documentation of software, with particular emphasis on understanding the whole process involved in using computers to solve practical problems.
- c7. Make effective use of general computing facilities, plan and manage a project to complete within budget and schedule.
- c8. Manage the need for continuing professional development in recognition of the need for lifelong learning.
- c9. Operate computing equipment efficiently, taking into account its logical and physical properties.
- c10. Apply tools and techniques for the design and development of applications.
- c11. Apply Internet technology
- c12. Prepare technical reports and presentations
- c13. Use appropriate diagrammatic and formal written notations in design work and in reports
- c14. Use a programming language and a variety of software tools and environments to construct, test and document software applications, which may include multimedia components.
- c15. Use multimedia production systems

c16. Apply software engineering and application technologies to achieve effective communication and interaction with end users

d. General and Transferable Skills

On successful completion of this program, graduates should be able to:

- d1. Communicate effectively by oral, written and visual means.
- d2. Work effectively as an individual and as a member of a team.
- d3. Collaborate effectively within multidisciplinary team.
- d4. Work in stressful environment and within constraints.
- d5. Prepare and present seminars to a professional standard.
- d6. Prepare technical reports, and a dissertation, to a professional standard; use IT skills and display mature computer literacy.
- d7. Demonstrate efficient IT capabilities.
- d8. Lead and motivate individuals.
- d9. Manage tasks and resources.
- d10. Search for information and adopt life-long self-learning.
- d11. Acquire entrepreneurial skills.
- d12. Manage one's own learning and development.
- d13. Prepare their work in the form of reports.
- d14. Communicate effectively with team members, managers and costumers.
- d15. Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension.
- d16. Develop a range of fundamental research skills, through the use of online resources, technical repositories and library-based material.

4. Academic standards

4a. External references for standards

The academic standards invoked in this specification are driven based on the National Academic Reference Standards (NARS) for "Computing" approved by the National Authority of Quality Assurance and Accreditation of Education on March 2010.

4b. Comparison of provision to external references

See the attached document "Program Matrices".

5. Curriculum Structure and Contents

5a. Program duration: 144 credit hours

5b. Program structure

- No. of credit hours: Compulsory (100), Elective (44)
- No. of program Levels (in credit-hours system): 4 levels.

The following table summarizes the program structure.

Subject Area	Credit	MM Program	Toleranc
	Hours	%	e
Humanities, ethical and Social Sciences (Univ.	18	% 12.5	% 10-8
Req.)			
Mathematics and Basic Sciences	28	% 19.44	% 18-16
Basic Computing Sciences (institution req.)	42	% 29.17	% 28-26
Applied Computing Sciences (specialization)	42	29.17 %	% 30-28
Projects and Training	14	%9.72	% 10-6
Subtotal	144	100 %	84-96 %

Optional (Institution character-identifying subjects)	15	N/A	4-16 %
Total	N/A	N/A	100%

6. Program Courses

			1/		
Code	Course Name	Credit	R	E	Achieved ILOs
HUM111	English Language I	2	✓		a1-a8,b1-b8,c1- c5,d1-d5
HUM112	English Language II	2		>	a1,a2,b1-b3,c1-c3,d1- d7
HUM121	Social Context of Computing	1	<		a1-a3,b1-b3,c1- c3,d1-d9
HUM122	Intellectual Property	1		\checkmark	a1,a2,b1-b3,c1-c3,d1- d7
HUM131	Organizational Behavior	2		>	a1,a2,b1-b3,c1-c3,d1- d7
HUM132	Interpersonal Communication	2	✓		a1-a3,b1-b3,c1- c3,d1-d9
HUM133	Computing Economics	2		\checkmark	a1-a6,b1,b2,c1-c3,d1- d7
HUM141	Computer Law	2		\checkmark	a1-a5,b1-b5,c1,c3,d1- d4
HUM142	Privacy and Civil Liberties	1		\checkmark	a1-a5,b1-b4,c2,c3,d1- d3
HUM151	Hand Drawing	2		\checkmark	a1-a4,b1,b4,c1-c3,d1- d3
HUM152	History of Computing	2		\checkmark	a2,a4-a6,a9,b1- b3,c1,c2,c4,d1-d3
HUM153	Islamic Culture	1		\checkmark	a1-a3,b2,b3,c1,c3,d2,d3
HUM154	Scientific Thinking	1		\checkmark	a1,a2,b1,b2,c1,d1-d3
HUM231	Business Administration	2	\checkmark		a1,a2,b1-b3,c1- c3,d1-d7
HUM232	Technical Writing	2	\checkmark		a1-a3,b1-b3,c1- c3,d1-d9
HUM241	Computers and Ethics	1	\checkmark		a1,a2,b1,b3,c1,c2,d1- d7
Subtotal			10	8	
Total			1	8	

6a.	Humanities, ethical and Social Sciences	(Univ. Reg.))
0.001			/

6 b .	Mathematics	and Basic	Sciences
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Code	Course Name	Credit	R	Е	Achieved ILOs
MATH101	Mathematics I	3	\checkmark		a1,a2,b1-b6,c1- c3,d1,d3
MATH102	Mathematics II	3	\checkmark		a1-a5,b1-b6,c1- c4,d1,d3
MATH201	Mathematics III	3		\checkmark	a1-a3,b1- b5,c1,c4,d1-d4
MATH202	Probability and Statistics	2	\checkmark		a1-a5,b1-b6c1-، c4,d1-d3
MATH301	Numerical Analysis	3		\checkmark	a1-a3,b1-b6,c1- c7,d1-d7
CS201	Discrete Structures	3		\checkmark	a1-a4,b1- b4,c1,c2,d1,d3
CS301	Operation Research	3		\checkmark	a1,a3-a6,A1,A2,b1- b3,B2,c1,c2

CS202	Simulation and Modeling	2	1		a1-a4,b1-
C5302		3	v		b4,c1,c2,d1,d3
DLIVC101	Physics I	2	1		a1-a6,b1-b4,c1-
FH15101	5	3	v		c6,d1-d6
DUVC102	Physics II	2			a1-a7,b1-b4,c1-
F1115102	-	3 🗸			c5,d1-d6
FF101	EE101 Electronice 2	0			a1-a5,b1-b6,c1-
EE101	Electronics	3	~		c5,d1-d6
EE10 2	Digital Circuits	2	1		a1-a8,b1-b8,c1-
EEIUZ	0	2	v		c5,d1-d5
EE 2 01	Digital Signal Processing	2		/	a1-a3,b1-
EE201	0 0 0	3		~	b5,c1,c4,d1-d4
Subtotal			22	6	
Total			2	28	

6с.	Basic Comp	ting Sciences	(institution rea.))
UL.	Dubic Compt	ing ociciaco	(initiation req.)	,

Code	Course Name	Credit	R	Е	Achieved ILOs
CS141	Programming Fundamentals	3	~		a1,a2,a3,a4,a5- a9,b1-b5,c1-c3,d1- d5
CS211	Data Structures and Algorithms	3	\checkmark		a1-a5,b1-b11,c1- c7,d1-d6
CS241	Object-Oriented Programming	3	\checkmark		a1-a5,b1-b11,c1- c7,d1-d6
CS321	Operating Systems	3	\checkmark		a1-a8,b1-b5,c1- c5,d1,d2
CS322	Computer Architecture and Operating Systems	3			a1-a5,b1-b11,c1- c7,d1-d6
CS341	Visual Programming	3		\checkmark	a1-a6,b1-b5,c1- c5,d1-d6
CS351	Computer Graphics	3	\checkmark		a1-a7,b1-b6,c1- c4,d1-d6
CS361	Artificial Intelligence	3		\checkmark	a1-a4,b1-b3,c1- c4,d1-d4
CS391	Software Engineering	3	✓		a1-a10,b1- b15.c1-c6.d1-d6
IS201	Foundations of Information Systems	3		\checkmark	a1-a7,b1-b5,c1- c6,d1,d3-d6
IS211	File Organization	3		\checkmark	a1-a4,a6-a9,b1- b4.c1-c6.d1-d6
IS212	Databases	3	✓		a1-a7,b1-b5,c1- c6,d1,d3-d6
IS231	Systems Analysis and Design	3		✓	a1-a4,a6-a9,b1- b4,c1-c6,d1-d5
IT101	IT Fundamentals	3	✓		a1-a6,a8,a9,b1- b3,c1-c4,d1-d4
IT251	Data Communications	3	✓		a1-a7,b1-b6,c1- c5,d1-d6
IT351	Computer Networks	3	✓		a1-a10,a17,b1- b5,c1-c7,d1-d9
IT371	Web Programming	3		✓	a1-a8,b1-b3,c1- c5,d1-d7
MM301	Introduction to Multimedia Technology	3	~		a1 , a2,a3 , b1- b4,c1,c2, c3-c7 , d1-d9
CE221	Computer Architecture	3	\checkmark		a1-a6,b1-b5,c1- c6,d1-d5

Subtotal	36	6	
Total	42		

6d. Applied Computing Sciences (specialization) and Institution character-identifying subjects

	Code	Course Name	Credit	Achieved ILOs
				a1-a6.b1-b5.c1-c6.d1-
	MM302	Introduction to Digital Video	3	d5
\sim				a1 , a2,a3 , b1-
Cor	MM321	3D Modeling and Animation	3	b4,c1,c2, c3-c7 , d1-
npı		Interactive Multimedia		d9
alsc	MM401	Development	3	d5
ry				a1, a2,a3, b1-
Co	MM411	Virtual Reality	3	b4,c1,c2, c3-c7 , d1-
urse				d5
es	CS451	Computer Animation	3	a1-a4,b1-b3,c1-c4,d1-
				a1-a3.b1-b4.c1-c3.d1-
	CS452	Computer Vision	3	d5
		Subtotal	18	
		Scripting and Storyboarding		a1 , a2,a3 , b1-
	MM402		3	b4,c1,c2, c3-c7 , d1-
		Digital Sound		09 a1-a6 b1-b5 c1-c6 d1-
	MM403		3	d5
				a1 , a2,a3 , b1-
	MM412	Human Computer Interaction	3	b4,c1,c2, c3-c7 , d1-
Ц		2D Dhata sugarhar an d Casan atur		d5
lect	MM421	3D Photography and Geometry MM421 Processing	3	a1, a2, a3, b1-
ive				d9
Co	MM422	Principles of 2D Animation	3	a1-a3,b1-b6,c1,c2,d1-d6
urs	CS352	Image Processing	3	a1-a3,b1-b6,c1,c2,d1-
es*	66662		5	d6
	CS453	Game Programming	3	a1-a4, b1,b3,b5, c1-
	CS353	Advanced Computer Graphics	3	a1-a3,b1-b6,c1,c2,d1-d6
	CS463	Pattern Recognition	3	a1-a3,b1-b6,c1,c2,d1-d6
	CS/171	Introduction to Computer Security	3	a1-a3,b1-b6,c1,c2,d1-
	10/17		5	d6
	IS417 IT271	Multimedia Databases	3	al-a8,b1-b5,c1-c5,d1,d2
	11371	Subtotal	3 24	a1-a0,01-00,01-00,01,02
Total 42				
Students	select only 8 cor	urses	74	

6e. Training and Projects

Code	Course Name	Credit	Achieved ILO's
IS221	Project Management	2	a4, a5,a7, a8, a11,a13,a14 b2, b5, b10, b12, c5, c10, c13

			d1-d4, d8,d14
CS381	Software Development and Professional Practice	3	a1-a8,b1-b5,c1-c5,d1,d2
MM331	Field Training	3	a1 , a2,a3 , b1-b4,c1,c2, c3-c7 , d1-d5
MM431	Capstone Project I	3	a4, a5,a7, a8, a11,a13,a14 b5, b12, b15, b17 c3, c10 d1-d4, d8
MM432	Capstone Project II	3	a5,a7, a8, a11,a14 b2, b5, b10, b12, b15, ,b17 c3, c5, c7,c10, c13 d1-d4
	Total	14	

7. Course Levels

	1 st Level Courses								
		C 114	D	Ty	pe]	Геас	hing	
Code	Course	Credits	Credits Prerequisites	D	- E	т	H0 T	urs D	
00141	Due en en milie e Francisco de menor tele	-	1771.01	ĸ	E		1	P OL IT	
CS141	Programming Fundamentals	3	11101	V		3		3H1	
IT101	IT Fundamentals	3	-	\checkmark		3		3 H ^T	
MATH101	Mathematics I	3	_	\checkmark		3	2		
MATH102	Mathematics II	3	MATH101	\checkmark		3	2		
PHYS101	Physics I	3	_	\checkmark		2		2 H ^s	
PHYS102	Physics II	3	_	\checkmark		2		2 Hs	
EE101	Electronics	3	_	\checkmark		2		2 Hs	
EE102	Digital Circuits	2	EE101	\checkmark		2		2 Hs	
HUM111	English Language I	2	_	\checkmark		2			
HUM112	English Language II	2	HUM111		\checkmark	2			
HUM121	Social Context of Computing	1	-	\checkmark		1			
HUM122	Intellectual Property	1	_		\checkmark	1			
HUM131	Organizational Behavior	2	_		\checkmark	2			
HUM132	Interpersonal Communication	2	_	\checkmark		2			
HUM133	Computing Economics	2	_		\checkmark	2			
HUM141	Computer Law	2	_		\checkmark	2			
HUM142	Privacy and Civil Liberties	1	-		\checkmark	1			
HUM151	Hand Drawing	2	_		\checkmark	1		$3\mathrm{H^s}$	
HUM152	History of Computing	2	_		\checkmark	2			
HUM153	Islamic Culture	1	-		\checkmark	1			
HUM154	Scientific Thinking	1	_		\checkmark	1			
Subtotal				28	8				
Total				3	6				

2nd Level Courses

Code	Course	Credits	B Prerequisites		ype	Г	'eacl Hot	hing urs
			-	R	Ε	L	Τ	Р
CS201	Discrete Structures	3	MATH102	\checkmark		3	2	
CS211	Data Structures and Algorithms	3	CS241	\checkmark		3		2 H ^T
CS241	Object-Oriented Programming	3	CS141	\checkmark		3		2 H ^T
IS201	Foundations of Information Systems	3	IT101		\checkmark	2		2 H ^T
IS211	File Organization	3	CS241		\checkmark	2		2 H ^T
IS212	Databases	3	IS201	\checkmark		3		2 H ^T
IS221	Project Management	2	IT101	\checkmark		2		2 Ho
IS231	Systems Analysis and Design	3	IT101		\checkmark	3	2	
IT251	Data Communications	3	IT101	\checkmark		3	2	
CE221	Computer Architecture	3	CS141, CS201	\checkmark		3		2 H ^T
MATH201	Mathematics III	3	MATH102		\checkmark	3	2	
MATH202	Probability and Statistics	2	MATH102	\checkmark		2		2 H ^T
EE201	Digital Signal Processing	3	MATH201		\checkmark	3		2 H ^T
HUM231	Business Administration	2	-	\checkmark		2		
HUM232	Technical Writing	2	HUM111	\checkmark		2		2 Ho
HUM241	Computers and Ethics	1	-	\checkmark		1		
Subtotal				27	0-12			
Total				2	7-39			

3rd Level Courses									
Code	Course	Cre dits Prerequisites	Type		Teaching Hours				
				R	Ε	L	Τ	Р	
CS301	Operation Research	3	CS201		>	3		2 H ^T	
CS302	Simulation and Modeling	3	MATH202		>	3		2 H ^T	
CS321	Operating Systems	3	CE221	\checkmark		3		2 H ^T	
CS341	Visual Programming	3	CS211		\checkmark	3		2 H ^T	
CS351	Computer Graphics	3	IT101, CS201	\checkmark		3		2 H ^T	
CS352	Image Processing	3			\checkmark	3		2 H ^T	
CS353	Advanced Computer Graphics	3	CS352		\checkmark	3		2 Ho	
CS361	Artificial Intelligence	3	IT101, CS201		\checkmark	3		$2 \mathrm{H}^{\mathrm{T}}$	
CS381	Software Development and Professional Practice	3	CS211, CS391	\checkmark		3		3 Ho	
CS391	Software Engineering	3	CS211	\checkmark		3	2		
IT351	Computer Networks	3	IT251, CE221	\checkmark		3		2 H ^T	
MM301	Introduction to Multimedia Technology	3	CS241	\checkmark		3		2 H ^T	
MM302	Introduction to Digital Video	3	CS241, MATH202	\checkmark		3		2 H ^T	
MM321	3D Modeling and Animation	3	IT101	\checkmark		1		6 Hs	
MM331	Field Training	3	IS221	\checkmark					
MATH 301	Numerical Analysis	3	MATH102		\checkmark	3	2		
Subtotal				27	0-15				

4th Level Courses									
Code	Course	Credits	Prerequisites	Туре		Teaching Hours			
				R	Ε	L	Τ	Р	
MM401	Interactive Multimedia Development	3	MM301	\checkmark		3		2 H ^T	
MM402	Scripting and Storyboarding	3	MM301		\checkmark	3		$2 \mathrm{H}^{\mathrm{T}}$	
MM403	Digital Sound	3	MM301		\checkmark	3		2 H ^T	
MM411	Virtual Reality	3	CS352	\checkmark		3		3	
MM412	Human Computer Interaction	3	CS341		\checkmark	3		2 H ^T	
MM421	3D Photography and Geometry Processing	3	MM301		\checkmark	3		2 H ^T	
MM431	Capstone Project I	3	CS381, IS221	\checkmark		1		4 H ^s	
MM432	Capstone Project II	3	CS381, IS221	\checkmark		1		4 H ^s	
MM422	Principles of 2D Animation	3	MM301		\checkmark	3		2 H ^T	
CS451	Computer Animation	3	CS352	\checkmark		3		$2 \mathrm{H^{T}}$	
CS452	Computer Vision	3	CS241, PHYS102	~		3		2 H ^T	
CS471	Introduction to Computer Security	3	CS211, IT351		\checkmark	3		2 Ho	
CS463	Pattern Recognition	3	CS361		\checkmark	3		2 Ho	
CS453	Game Programming	3	MM301		\checkmark	3		2 Ho	
IS417	Multimedia Databases	3	IS212, CS241		\checkmark	3		2 Ho	
IT371	Web Programming	3	CS141, IT251		\checkmark	3		2 H ^T	
Subtotal	-			18	18-24				
Total				3	36-42				

8. Contents of Courses

Syllabus: See the below

9. Program Admission Requirements

High score in secondary school education certificate in (Mathematical Section).

10. Regulations for progression and program completion

Please, refer to faculty bylaw (Curriculum of Undergraduate Programs), 2011.

11. Student Assessment (Methods and rules for student assessment)

Method (tool)	Intended leaning outcomes assessed
1- Written examinations	Knowledge and Understanding - Intellectual Skills - Professional Skills - General Skills
2- Oral examination	Knowledge and Understanding - Intellectual Skills
3- Laboratory examination	Professional Skills - General Skills
4- Graduation project	Professional Skills - General Skills

5- Reports and homework	Knowledge and Understanding

12. Program Evaluation

Evaluator	Tool	Sample
1- Senior students	Questionnaires	
2- Alumni	Questionnaires	
3- Stakeholders	Questionnaires, Joint Discussion	
4-External Evaluator(s) (External Examiner(s))	Review Reports	

MM Program Matrices



Assiut University Faculty of Computers & Information Department of Multimedia Quality Assurance Unit

MM Undergraduate Program Matrices



The main description of Computer Science Program can be summarized in different types of matrices. These matrices are:

1. Academic Standards Matrix

This matrix shows the ILOs invoked in MM Program Specifications and those existing in NARS and the corresponding between them.

- 2. Program Matrix I (Courses NARS General) This matrix shows how MM Program Courses can cover the NARS general ILOs.
- 3. Program Matrix II (Courses NARS Special) This matrix shows how MM Program Courses can cover the NARS special ILOs.
- 4. Program Matrix III (Courses Knowledge and Understanding Skills) This matrix shows how MM Program Courses can cover Knowledge and Understanding Skills invoked in MM Program Specifications.
- 5. Program Matrix IV (Courses Intellectual Skills)

This matrix shows how MM Program Courses can cover Intellectual Skills invoked in MM Program Specifications.

- 6. Program Matrix V (Courses Professional and Practical Skills) This matrix shows how MM Program Courses can cover Professional and Practical .Skills invoked in MM Program Specifications
- 7. Program Matrix VI (Courses Transferable Skills) This matrix shows how MM Program Courses can cover TransferableSkills invoked in MM Program Specifications.
- 8. Program Matrix VII (Aims ILOs) This matrix shows how MM Program ILOs can cover the program aims.
- 9. Teaching and Learning Methods Matrix VIII (ILOs-Teaching and Learning Methods)

This matrix shows what teaching methods are covered by MM Program ILOs.

10. Assessment Methods Matrix VIIII (ILOs-Assessment Methods) This matrix shows what assessment methods are covered by MM Program ILOs

Academic Standards (Knowledge and Understanding Skills) (October2010)

MM Program ILOs	Correspondin g in NARS		NARS ILOs - General	NARS ILOs - Special
a1. Understand the essential mathematics relevant to computer science and multimedia.		A1	K1. Knowledge and understanding of essential facts, concepts, principles, theories and practices that underpin	A1. Understand the essential mathematics relevant to computer science.
a2. Understand high-level programming languages.		A2	computing as an academic discipline.	A2. Use high-level programming
a3. Demonstrate basic knowledge and understanding of a core of mathematical analysis, algebra, applied mathematics and statistics.		A3	K2. Knowledge of the tools, practices and methodologies used in the specification, design, implementation	A3. Demonstrate basic knowledge and understanding of a core of analysis,
a4. Interpret data qualitatively and/or quantitatively.		A4	and critical evaluation of computer software systems.	algebra, applied mathematics and statistics.
a5. Know and understand the principles and techniques of a number of application areas informed by the research directions of multimedia.		A5	K3. Knowledge of the methods used in defining and assessing criteria for measuring the extent to which a	A4. Interpreting and analyzing data qualitatively and/or quantitatively. A5. Know and understand the
a6. Show a critical understanding of the principles of artificial intelligence, image, and pattern recognition, computer vision and Human computer Interaction.	K8	A6	computer system is appropriate for its current deployment and future evolution.	principles and techniques of a number of application areas informed by the research directions
a7. Understand the fundamental topics in computer systems, including hardware architectures and operating systems.	K1	A7	K4. Knowledge and understanding of the current and underlying technologies that support computer processing and	of the subject, such as artificial intelligence, databases and computer graphics.
a8. Select advanced topics to provide a deeper understanding of some aspects of object-oriented analysis and design, and software engineering.	K1	A8	inter-computer communication. K5. Knowledge and understanding of the principals of generating tests which	A6. Show a critical understanding of the principles of artificial intelligence, image, and pattern
a9. Select advanced topics to provide a deeper understanding of some aspects of the artificial intelligence, image processing, and computer graphics and animation.	K1	A8	investigate the functionality of computer programs and computer systems and evaluating their results.	recognition. A7. Understanding of fundamental topics in Computer Science, including bardware and software
a10. Demonstrate strong knowledge of fundamentals of programming and the construction of computer-based systems.	K1	A7	management principles relevant to computing	architectures, software engineering principles and methodologies,
a11. Provide a deeper understanding of legal, professional and moral aspects of the exploitation of computing.	K7		K/. Knowledge of the professional, legal, moral and ethical issues relevant to the computing industry.	operating systems and software tools. A8. Select advanced topics to provide a deeper understanding of some aspects of the subject, such as

MM Program ILOs	Correspondin g in NARS		NARS ILOs - General	NARS ILOs - Special
a12. Know the tools, practices and methodologies used in the specification, design, implementation and critical evaluation of multimedia systems.	K2	A7	K8. Knowledge of developments in research fields across a range of knowledge areas	hardware systems design, object- oriented analysis and design, and artificial intelligence, and parallel and concurrent computing.
a13. Know the methods used in defining and assessing criteria for measuring the extent to which a computer system is appropriate for its current deployment and future evolution.	K3			and concurrent computing.
a14. Know the current and underlying technologies that support computer processing and inter-computer communication.	K4			
a15. Understand of the principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	K5			

Academic Standards (Intellectual Skills)

MM Program ILOs	Correspondin g in NARS	NARS ILOs – General	NARS ILOs - Special
b1. Discuss traditional and nontraditional problems, set goals towards solving them, and observe results	B1	I1. Analyze a wide range of problems and provide solutions related to the design and construction of computing systems through	B1. Define traditional and nontraditional problems, set goals towards solving
b2. Compare between (methods, techniquesetc).	B2	suitable algorithms, structures, diagrams, and	them, and. observe results.
b3. Apply classifications of (data, results, methods, techniques etc.).	B3	I2. Apply the concepts, principles, theories and	between (algorithms,
b4. Analyze attributes, components, relationships, patterns, main ideas, and errors.	B4	practices underpinning computing as an academic discipline.I3. Understand and analyze problems and	methods, techniquesetc). B3. Perform classifications of (data, results, methods,
b5. Summarize the proposed solutions and their results.	В5	evaluate computer software systems for their solution.	techniques, algorithms etc.).
b6. Restrict solution methodologies upon their results.	B6	I4. Define and assess criteria to measure the	B4. Identify attributes,
b7. Establish criteria, and verify solutions.	B7	current deployment and future evolution, and	patterns, main ideas, and
b8. Show a range of solutions and critically evaluate and justify proposed design solutions.	B8	to interpret the results thereof.I5. Analyze, propose and evaluate alternative computer systems and processes taking into	errors. B5. Summarize the proposed solutions and their results.
b9. Analyze computer science problems with pressing commercial or industrial constraints.	B9	account limitations, constraints, fit-for- purpose, general quality, and possible trade- offs within the parameters of the problem.	B6. Restrict solution methodologies upon their results.
b10. Generate an innovative design to solve a problem containing a range of commercial and industrial constraints.	B10	I6. Synthesize ideas, proposals and designs effectively using rational and reasoned arguments for presentation to a range of	B7. Establish criteria, and verify solutions.B8. Identify a range of solutions
b11. Create and/or justify designs to satisfy given requirements (synthesis, evaluation, application).		audiences. I7. Generate and evaluate the results of tests to investigate the functionality of computer	and critically evaluate and justify proposed design
b12. Apply the concepts, principles, theories and practices underpinning computing as an academic discipline.	13, 18	systems.	B9. Solve computer science problems with pressing
b13. Apply knowledge and methods from a variety of sources	15		

b14. Analyze requirements of information manipulation and	I1	18. Reach computing judgments considering	commercial or industrial
communication problems and design solutions based around appropriate		balanced costs, benefits, safety, quality,	constraints.
integration of multimedia, Internet and computer software technologies		reliability, and environmental impact.	B10. Generate an innovative
	10	I9. To be guided by the professional, legal, moral	design to solve a problem
b15. Plan, conduct and report on a program of work covering multiple	12	and ethical issues relevant to the computing	containing a range of
system lifecycle stages and leading to an end-product, with evaluation of		industry.	commercial and industrial
the end-product, and the process and technologies employed.		I10. Read and evaluate research papers in a range	constraints.
11/ South size ideas and a desire offer the low in a strend	T.4	of knowledge areas.	
b16. Synthesize ideas, proposals and designs effectively using rational	14		
and reasoned arguments for presentation to a range of audiences.			
	T		
b17. Correlate the results of tests to investigate the functionality of	16		
computer systems.			

Academic Standards (Professional and Practical Skills)

MM Program ILOs	Corresp in N	onding ARS	NARS ILOs - General	NARS ILOs - Special
c1. Use appropriate programming languages and design methodologies.		C1	P1. Operate computing equipment effectively, recognizing its logical and	C1. Use appropriate programming languages, web-based systems and tools, design methodologies, and database systems.
c2. Use appropriate web-based systems, tools and design methodologies.		C1	physical properties, capabilities and limitations.	C2. Communicate effectively by oral, written and visual means.
c3. Specify, design, and implement computer-based systems.		C1	P2. Effectively deploy computers to solve	C3. Perform independent information acquisition and management, using the scientific literature and Web
c4. Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds, including text, images, sound, and video.		C3	P3. Deploy effectively the knowledge and tools used for the construction and documentation of	 sources. C4. Prepare and present seminars to a professional standard. C5. Perform independent information acquisition and management, using the scientific literature and Web sources.
c5. Apply the principles of human-computer interaction to the evaluation and construction of a wide range of materials including user interfaces, web pages, and multimedia systems.	P2	C7	computer applications. P4. Work effectively individually, under direct supervision and/or as part	 C6. Prepare technical reports, and a dissertation, to a professional standard; use IT skills and display mature computer literacy. C7. Specify, design, and implement computer-based systems.
c6. Deploy effectively the tools used for the construction and documentation of software, with particular emphasis on		C8	of a team.	er epoer, assign, and imponient computer based systems.

understanding the whole process involved in using computers to solve practical problems.			P5. Use an appropriate mix of tools and aids in preparing and presenting reports for	C8. Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem.C9. Apply the principles of effective information management.
c7. Make effective use of general computing facilities, plan and manage a project to complete within budget and schedule.		С9	a range of audiences, including management,	information organization, and information-retrieval skills to information of various kinds, including text, images,
c8. Manage the need for continuing professional development in recognition of the need for lifelong learning.		C10	academic community. P6. Commercialize knowledge	C10. Apply the principles of human-computer interaction to the evaluation and construction of a wide range of
c9. Operate computing equipment efficiently, taking into account its logical and physical properties.	P7	C11	and skills to computing community and industry. P7. Assess the implications,	materials including user interfaces, web pages, and multimedia systems. C11. Identify any risks or safety aspects that may be involved
c10. Apply tools and techniques for the design and development of applications.	Р3	C12	risks or safety aspects involved in the operation of computing equipment	in the operation of computing equipment within a given context.
c11. Apply Internet technology	P1		within a specific context.	and documentation of software, with particular emphasis on understanding the whole process involved in using
c12. Prepare technical reports and presentations		C3		computers to solve practical problems. C13. Prepare technical reports, and a dissertation, to a
c13. Use appropriate diagrammatic and formal written notations in design work and in reports	19			professional standard.
c14. Use a programming language and a variety of software tools and environments to construct, test and document software applications, which may include multimedia components.	P1			
c15. Use multimedia production systems	I10			
c16. Apply software engineering and application technologies to achieve effective communication and interaction with end users.	P2			

Academic Standards (Transferable Skills)

MM Program ILOs	Corres in N	ponding NARS	NARS ILOs - General	NARS ILOs - Special
d1. Communicate effectively by oral, written and visual means.	Т6	C2	 T1. Demonstrate the ability to make use of a range of learning resources and to manage one's own learning. T2. Demonstrate efficient skills in team management, time 	_
d2. Work effectively as an individual and as a member of a team.d3. Collaborate effectively within multidisciplinary	T2 P4		 T2. Demonstrate efficient skins in team management, unle management and organizational skills. T3. Show effective information-retrieval. T4. Work in stressful environment and within constraints, cone with multiple tasks. 	
team. d4. Work in stressful environment and within constraints.	T4		 T5. Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension. T6. Exhibits communication skills, public speaking and Presentation skills, and delegation, writing skills, oral 	
d5. Prepare and present seminars to a professional standard.	Р5	C4	delivery, and effectively using various media for a variety of audiences.T7. Display effective use of general computing facilities.	
d6. Prepare technical reports, and a dissertation, to a professional standard; use IT skills and display mature computer literacy.		C6	T8. Develop a range of fundamental research skills, through the use of online resources, technical repositories and library-based material.	
d7. Demonstrate efficient IT capabilities.	T3, T7		19. Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for Life Long Learning.	
d9. Manage tasks and resources.	T2		-	
d10. Search for information and adopt life-long self-learning.	Т3, Т9	C5		
d11. Acquire entrepreneurial skills.	P6			
d12. Manage one's own learning and development.	T1, T9			
d13. Prepare their work in the form of reports.	P5	C13		

d14. Communicate effectively with team members,	T6	C2
managers and costumers.		
d15 Exhibit appropriate numeracy skills in	T5	
understanding and presenting cases involving a	15	
quantitative dimension.		
	ma	
d16. Develop a range of fundamental research skills,	18	
repositories and library-based material		
repositories and norary based material.		

Academic Standards Matrix

					Intellectu	al Skills	
	Knowledge and Ur	derstanding Sk	tills	NARS ILOs General	Covering ILOs in MM Program	NARS ILOs Special	Covering ILOs in MM Program
NARS ILOs General	Covering ILOs in MM Program	NARS ILOs Special	Covering ILOs in MM Program	I1	b14	B1	b1
K1	a7, a8, a9, a10	A1	a1	I2	b15	B2	b2
K2	a12	A2	a2	I3	b12	B3	b3
K3	a13	A3	a3	I4	b16	B4	b4
K4	a14	A4	a4	15	b13	B5	b5
K5	a15	A5	a5	I6	b16	B 6	b6
K6		A6	a6	I7	b16	B 7	b7
K7	a11	A7	a7,a10, a12	18	b11	B8	b8
K8	a6	A8	a8, a9	19	c13	B9	b9
			·	I10	c15	B10	b10

	Professional and	Practical Skills	S
NARS ILOs General	Covering ILOs in CS Program	NARS ILOs Special	Covering ILOs in CS Program
P1	c11, c14	C1	c1, c2, c3
P2	c5, c16	C2	d1, d14
Р3	c10	C3	c4, c12
P4	d3		
P5	d5, d13	C4	d5
P6	d11	C5	d10
P 7	с9	C6	d6
		C7	c5
		C8	c6
		С9	c7
		C10	c8
		C11	с9
		C12	c10
		C13	d13

Tran	sferable skills
NARS ILOs	Covering ILOs in CS
General	Program
T1	d12
T2	d2, d9
T3	d7, d10
T4	d4
T5	d15
T6	d1, d14
T7	d7
T8	d16
T9	d10, d12

MM Program Courses

	Course Colle	Course Title	Ty	/pe				Ту	/pe
	Course Code	Course little	Е	R				E	R
	CS141	Programming Fundamentals				CS301	Operation Research	\checkmark	
	IT101	IT Fundamentals				CS302	Simulation and Modeling	\checkmark	
	MATH101	Mathematics I				CS321	Operating Systems		\checkmark
	MATH102	Mathematics II				CS341	Visual Programming	\checkmark	
	PHYS101	Physics I				CS351	Computer Graphics		\checkmark
	PHYS102	Physics II				CS352	Image Processing	\checkmark	
	EE101	Electronics				CS353	Advanced Computer Graphics	\checkmark	
	EE102	Digital Circuits			3rd	CS381	Software Development and Professional Practice		~
	HUM111	English Language I			Lev	CS391	Software Engineering		\checkmark
1st]	HUM112	English Language II			rel	IT351	Computer Networks		\checkmark
Leve	HUM121	Social Context of Computing				MM301	Introduction to Multimedia Technology		\checkmark
ēl	HUM122	Intellectual Property				MM302	Introduction to Digital Video		\checkmark
	HUM131	Organizational Behavior				MM321	3D Modeling and Animation		\checkmark
	HUM132	Interpersonal Communication				MM331	Field Training		\checkmark
	HUM133	Computing Economics				MATH301	Numerical Analysis	\checkmark	
	HUM141	Computer Law				MM401	Interactive Multimedia Development		\checkmark
	HUM142	Privacy and Civil Liberties				MM402	Scripting and Storyboarding	\checkmark	
	HUM151	Hand Drawing				MM411	Virtual Reality		\checkmark
	HUM152	History of Computing				MM412	Human Computer Interaction	\checkmark	
	HUM153	Islamic Culture			4	MM421	3D Photography and Geometry Processing	\checkmark	
	HUM154	Scientific Thinking			th]	MM431	Capstone Project I		\checkmark
	CS201	Discrete Structures		\checkmark	e	MM432	Capstone Project II		\checkmark
Ŋ	CS211	Data Structures and Algorithms		\checkmark	ve]	MM422	Principles of 2D Animation	\checkmark	
I b	CS241	Object-Oriented Programming		\checkmark	_	CS451	Computer Animation		\checkmark
Leve	IS201	Foundations of Information Systems	\checkmark			CS452	Computer Vision		\checkmark
Ť	IS211	File Organization	\checkmark			CS471	Introduction to Computer Security	\checkmark	
	IS212	Databases		\checkmark		CS463	Pattern Recognition	\checkmark	

Course Code	Course Title	T	ype			Ту	ре
Course Code	Course Inte	Е	R			Е	R
IS221	Project Management		\checkmark	CS453	Game Programming	\checkmark	
IS231	Systems Analysis and Design	\checkmark		IS417	Multimedia Databases	\checkmark	
IT251	Data Communications		\checkmark	IT371	Web Programming	\checkmark	
CE221	Computer Architecture		\checkmark				
MATH201	Mathematics III	\checkmark					
MATH202	Probability and Statistics		\checkmark				
EE201	Digital Signal Processing	\checkmark					
HUM231	Business Administration		\checkmark				
HUM232	Technical Writing		\checkmark				
HUM241	Computers and Ethics		\checkmark				

Program Matrix I (Courses - NARS General)

		K1	K2	K3	K4	K5	K6	K7	K8	I1	I2	I3	I4	15	I6	17	I8	I9	I10	P1	P2	P3	P4	P5	P6	P7	T1	T2	T3	T4	T5	T6	T7	T8	Т9
	CS141	\checkmark								\checkmark										\checkmark								\checkmark	\checkmark	\checkmark		\checkmark	\checkmark		
	IT101																			\checkmark						\checkmark	\checkmark	\checkmark		\checkmark		\checkmark			\checkmark
	MATH101																				\checkmark							\checkmark				\checkmark			
	MATH102									\checkmark										\checkmark						\checkmark		\checkmark				\checkmark			
	PHYS101									\checkmark												\checkmark	\checkmark	\checkmark			\checkmark		\checkmark			\checkmark			\checkmark
	PHYS102																								\checkmark		\checkmark	\checkmark		\checkmark		\checkmark			\checkmark
	EE101	\checkmark	\checkmark											\checkmark													\checkmark	\checkmark				\checkmark			\checkmark
	EE102	\checkmark																								\checkmark	\checkmark	\checkmark				\checkmark			\checkmark
	HUM111																				\checkmark														
1 <u>s</u>	HUM112	\checkmark						\checkmark		\checkmark						\checkmark				\checkmark				\checkmark		\checkmark		\checkmark				\checkmark			
t Lev	HUM121						\checkmark													\checkmark					\checkmark	\checkmark		\checkmark			\checkmark				
el	HUM122						\checkmark	\checkmark												\checkmark					\checkmark			\checkmark				\checkmark			
	HUM131		\checkmark								\checkmark										\checkmark							\checkmark	\checkmark	\checkmark		\checkmark	\checkmark		
	HUM132	\checkmark							\checkmark														\checkmark	\checkmark				\checkmark	\checkmark	\checkmark		\checkmark	\checkmark		
	HUM133	\checkmark																		\checkmark	\checkmark				\checkmark	\checkmark		\checkmark		\checkmark		\checkmark			
	HUM141				\checkmark								\checkmark			\checkmark				\checkmark	\checkmark							\checkmark		\checkmark					
	HUM142																				\checkmark							\checkmark				\checkmark			
	HUM151							\checkmark														\checkmark		\checkmark	\checkmark			\checkmark	\checkmark			\checkmark	\checkmark	\checkmark	
	HUM152	\checkmark										\checkmark					\checkmark				\checkmark	\checkmark			\checkmark			\checkmark	\checkmark			\checkmark	\checkmark		
	HUM153											\checkmark					\checkmark				\checkmark				\checkmark		\checkmark	\checkmark	\checkmark	\checkmark			\checkmark		\checkmark
	HUM154	\checkmark	\checkmark									\checkmark					\checkmark			\checkmark	\checkmark				\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark			\checkmark		\checkmark
2 nd Le	CS201																				\checkmark							\checkmark				\checkmark			
evel	CS211																				\checkmark							\checkmark				\checkmark			_
	CS241							~										\checkmark							\checkmark			√		\checkmark		\checkmark			
	IS201	\checkmark	\checkmark								\checkmark	\checkmark		\checkmark			\checkmark				\checkmark	\checkmark			\checkmark			\checkmark				\checkmark			
	IS211	\checkmark	\checkmark			\checkmark	\checkmark			\checkmark	\checkmark	\checkmark				\checkmark	\checkmark				\checkmark					\checkmark		\checkmark	\checkmark	\checkmark		\checkmark			\checkmark
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	IS221									\checkmark											\checkmark							\checkmark				\checkmark			
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	IT251	\checkmark					\checkmark		\checkmark	\checkmark		\checkmark			\checkmark		\checkmark				\checkmark		\checkmark	\checkmark		\checkmark		\checkmark	\checkmark	\checkmark		\checkmark			\checkmark
	CE221	\checkmark									\checkmark		\checkmark	\checkmark							\checkmark		\checkmark	\checkmark	\checkmark		\checkmark	\checkmark						\checkmark	\checkmark
	MATH201																								\checkmark			\checkmark	\checkmark			\checkmark	\checkmark		
	MATH202		\checkmark								\checkmark										\checkmark				\checkmark			\checkmark	\checkmark			\checkmark	\checkmark		
	EE201																				\checkmark				\checkmark			\checkmark	\checkmark			\checkmark	\checkmark		
	HUM231	\checkmark					\checkmark			\checkmark		\checkmark					\checkmark				\checkmark				\checkmark	\checkmark		\checkmark	\checkmark			\checkmark	\checkmark		

Н	IUM232				\checkmark															\checkmark					\checkmark	\checkmark		\checkmark	\checkmark	\checkmark		\checkmark	\checkmark		\checkmark
Н	IUM241			\checkmark									\checkmark										\checkmark			\checkmark		\checkmark	\checkmark	\checkmark		\checkmark	\checkmark		
С	CS301										\checkmark											\checkmark						\checkmark				\checkmark			
С	CS302	\checkmark							\checkmark														\checkmark	\checkmark				\checkmark	\checkmark	\checkmark		\checkmark	\checkmark		
C	CS321																											\checkmark				\checkmark			
C	CS341								\checkmark										\checkmark				\checkmark					\checkmark				\checkmark			
(J) C	CS351	\checkmark	\checkmark																		\checkmark							\checkmark				\checkmark			
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M	AM301																																		
М	/IM302	\checkmark	\checkmark		\checkmark			\checkmark												\checkmark		\checkmark				\checkmark	\checkmark		\checkmark			\checkmark	\checkmark		\checkmark
М	/M321	\checkmark	\checkmark		\checkmark	√				√	\checkmark								√					√	\checkmark		√	\checkmark	√						\checkmark
М	/IM331																																		
M	/ATH301								\checkmark										\checkmark				\checkmark					\checkmark				\checkmark			
M	/IM401	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark										\checkmark					\checkmark	\checkmark		\checkmark									
M	/IM402	\checkmark						\checkmark			\checkmark		\checkmark		\checkmark										\checkmark		\checkmark	\checkmark	\checkmark						\checkmark
M	/IM403		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark			\checkmark				\checkmark	\checkmark			\checkmark	\checkmark	\checkmark		\checkmark	\checkmark			\checkmark		\checkmark
M	/IM411	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark				\checkmark			\checkmark	\checkmark		\checkmark		\checkmark		\checkmark	\checkmark		\checkmark	\checkmark						
M	/IM412	\checkmark	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark		\checkmark		\checkmark		\checkmark								\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
N	лМ421	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark			\checkmark			\checkmark		\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		\checkmark		\checkmark	\checkmark		\checkmark	\checkmark
	0.421		<u>√</u>	<u>ار</u>							<u>ار</u>	<u>ار</u>															<u>ار</u>	<u>ار</u>							
4 5 V	4N4422		V	· V	· V			 √		· √		-			\checkmark								\checkmark		\checkmark		√	, V	√						
Lev	/IIVI432		•	•						-					•								•	· √	•		· √	·							
ē	20.451	√										•									•		J	· √			-	·				\checkmark	√		
	26451	-																					•					·				√			
	26452																		\checkmark				\checkmark					• √				• √			
	-5471 79462	\checkmark	\checkmark																		\checkmark		•					·				\checkmark			
	25403	-	•																		·							·				√			
	S/17			J						-											·							√				√	$\left - \right $		·
15	T371			•						-															\checkmark			√	\checkmark			√	\checkmark		
	13/1	K1	K2	K3	K4	К5	K6	К7	К8	I1	12	I3	I4	15	16	17	18	19	I10	P1	P2	P3	P4	P5	P6	P7	T1	T2	Т3	T4	Т5	т6	- T7	T8	Т9

Program Matrix II (Courses - NARS Special)

		A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	В3	B4	В5	В6	B7	B8	В9	сі	C2	C3	C4	C5	C6	С7	C8	C9	C10	C11	C12	C13
	CS141	\checkmark								\checkmark										\checkmark								\checkmark	\checkmark	\checkmark	
	IT101																			\checkmark						\checkmark	\checkmark	\checkmark		\checkmark	
	MATH101		[_	Γ_	$\left[\right]$																\checkmark							\checkmark			
	MATH102									\checkmark										\checkmark						\checkmark		\checkmark			
	PHYS101									\checkmark												\checkmark	\checkmark	\checkmark			\checkmark		\checkmark		
	PHYS102																								\checkmark		\checkmark	\checkmark		\checkmark	
	EE101	\checkmark	\checkmark											\checkmark													\checkmark	\checkmark			
	EE102	\checkmark																								\checkmark	\checkmark	\checkmark			
	HUM111																				\checkmark										
1 <u>8</u>	HUM112	\checkmark						\checkmark		\checkmark						\checkmark				\checkmark				\checkmark		\checkmark		\checkmark			
t Lev	HUM121						\checkmark													\checkmark					\checkmark	\checkmark		\checkmark			\checkmark
′el	HUM122						\checkmark	\checkmark												\checkmark					\checkmark			\checkmark			
	HUM131		\checkmark								\checkmark										\checkmark							\checkmark	\checkmark	\checkmark	
	HUM132	\checkmark							\checkmark														\checkmark	\checkmark				\checkmark	\checkmark	\checkmark	
	HUM133	\checkmark																		\checkmark	\checkmark				\checkmark	\checkmark		\checkmark		\checkmark	
	HUM141				\checkmark								\checkmark			\checkmark				\checkmark	\checkmark							\checkmark		\checkmark	
	HUM142																				\checkmark							\checkmark			
	HUM151							\checkmark														\checkmark		\checkmark	\checkmark			\checkmark	\checkmark		
	HUM152	\checkmark										\checkmark					\checkmark				\checkmark	\checkmark			\checkmark			\checkmark	\checkmark		
	HUM153											\checkmark					\checkmark				\checkmark				\checkmark		\checkmark	\checkmark	\checkmark	\checkmark	
	HUM154	\checkmark	\checkmark									\checkmark					\checkmark			\checkmark	\checkmark				\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	
	CS201																				\checkmark							\checkmark			
	CS211																				\checkmark							\checkmark			
	CS241							\checkmark										\checkmark							\checkmark			\checkmark		\checkmark	
	IS201	\checkmark	\checkmark								\checkmark	\checkmark		\checkmark			\checkmark				\checkmark	\checkmark			\checkmark			\checkmark			
	IS211	\checkmark	\checkmark			\checkmark	\checkmark			\checkmark	\checkmark	\checkmark				\checkmark	\checkmark				\checkmark					\checkmark		\checkmark	\checkmark	\checkmark	
	IS212								\checkmark												\checkmark						\checkmark		\checkmark		
2nd I	IS221									\checkmark											\checkmark							\checkmark			
jeve	IS231																				\checkmark	\checkmark			\checkmark			\checkmark	\checkmark		\checkmark
-	IT251	\checkmark					\checkmark		\checkmark	\checkmark		\checkmark			\checkmark		\checkmark				\checkmark		\checkmark	\checkmark		\checkmark		\checkmark	\checkmark	\checkmark	
	CE221	\checkmark									\checkmark		\checkmark	\checkmark							\checkmark		\checkmark	\checkmark	\checkmark		\checkmark	\checkmark			
	MATH201 111																								\checkmark			\checkmark	\checkmark		
	MATH202 2		\checkmark								\checkmark										\checkmark				\checkmark			\checkmark	\checkmark		
	EE201																				\checkmark				\checkmark			\checkmark	\checkmark		
	HUM231	\checkmark					\checkmark			\checkmark		\checkmark					\checkmark				\checkmark				\checkmark	\checkmark		\checkmark	\checkmark	_	

	HUM232				\checkmark															\checkmark					\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	
										-			./						_				./			./		./	./	./	
	HUM241	_		v						_			v						_				v			•		× /	~	•	
	CS301										V											V						V			
	CS302	~							~														V	~				V	~	V	
	CS321																											\checkmark			
	CS341								\checkmark										\checkmark				\checkmark					\checkmark			
	CS351	\checkmark	\checkmark																		\checkmark							\checkmark			
	CS352																				\checkmark						\checkmark	\checkmark	\checkmark		
ယ	CS353			\checkmark									\checkmark													\checkmark		\checkmark		\checkmark	
rd L6	CS381								\checkmark																\checkmark			\checkmark	\checkmark		
evel	CS391	\checkmark																											\checkmark	\checkmark	
	IT351	\checkmark							\checkmark	-					\checkmark	\checkmark		\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		\checkmark		\checkmark		\checkmark	
	MN/201	\checkmark	\checkmark	\checkmark					\checkmark	\checkmark		\checkmark				\checkmark			\checkmark	\checkmark	\checkmark		\checkmark		\checkmark	\checkmark	\checkmark		\checkmark		
	MINISUI															/					1	/		/				1	/		/
	MM302	×		Ň	Ň			×		Ň	Ň	~	v	Ň	~	~					×	×		V				v	~	~	~
	MM321					\checkmark		\checkmark	\checkmark										\checkmark	\checkmark	\checkmark	\checkmark		\checkmark							
	MM331																														
	MATH301								\checkmark										\checkmark				\checkmark					\checkmark			
	MM401							\checkmark	\checkmark						\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark									\checkmark	\checkmark
	MM402							\checkmark	\checkmark															\checkmark					\checkmark	\checkmark	\checkmark
	MM403				\checkmark	\checkmark	\checkmark	\checkmark														\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
	MM411							\checkmark	\checkmark									\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark		\checkmark					
	MM412					\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark						\checkmark											
	MM421							\checkmark	\checkmark										\checkmark		\checkmark	\checkmark		\checkmark			\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
	MM431				\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark							\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark					
4 [±]	MM432							√	\checkmark								\checkmark	\checkmark	\checkmark						\checkmark		\checkmark	\checkmark	\checkmark	\checkmark	
^h Le	MM422					\checkmark	\checkmark	√	\checkmark	\checkmark					\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark									
vel	CS451	\checkmark							\checkmark														\checkmark	\checkmark				\checkmark	\checkmark	\checkmark	_
	CS451																											\checkmark			_
	C3452									-																		./			
	C5471	/	1						v	_									–		1		~					× /			_
	CS463	~	~																		× /						1	V /			
	CS453																				\checkmark						\checkmark	V	√		
	IS417			\checkmark									\checkmark													\checkmark		\checkmark		\checkmark	
	IT371								\checkmark																\checkmark			\checkmark	\checkmark		
		A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	В5	B6	B7	B 8	B9	сı	C2	C3	C4	C5	C6	C7	C8	С9	C10	C11	C12	C13

Program Matrix III (Courses - Knowledge and Understanding Skills)

	Course	a1	a2	a3	a4	a5	a6	a7	a8	a9	a1 0	a1 1	a12	a1 3	a1 4	a15
	CS141	~	√			√	√	√	√	√						
	IT101	~	✓	~	√	~	√		√	~						
	MATH10 1	~	~													
	MATH10 2	✓	~	√	~	√										
	PHYS101	✓	~	~	√	~	√									
	PHYS102	~	✓	√	√	√	√	√								
	EE101	~	~	~	~	~										
	EE102	~	~	~	~	~	~	~	~							
	HUM111	~														
1 st	HUM112	~	√													
Leve	HUM121	✓	~	~												
ēl	HUM122	~	✓													
	HUM131	~	~													
	HUM132	~	~	~												
	HUM133	~	✓	~	✓	~	~									
	HUM141	~	~	~	√	~										
	HUM142	~	~	~	√	~										
	HUM151	~	~	~	~											
	HUM152		~		~	~	~			~						
	HUM153	√	~	~												
	HUM154	√	\checkmark													
	CS201	\checkmark	\checkmark													
	CS211	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark										
	CS241	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark										
	IS201	\checkmark														
	IS211	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark										
2 <u>r</u>	IS212	\checkmark	\checkmark													
^{id} Lev	IS221	\checkmark	\checkmark	\checkmark												
vel	IS231	\checkmark	\checkmark													
	IT251	\checkmark														
	CE221	\checkmark														
	MATH20 1	\checkmark	\checkmark													
	MATH20 2	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark										
	EE201	\checkmark														

			-						-			-		-	-	
	HUM231	\checkmark	\checkmark	\checkmark												
	HUM232	✓		√	√	✓	√									
	HUM241	~	✓	~	√											
	CS301	√	√	√	√	√	√	√	√							
	CS302	√	√	√	√	✓	√									
	CS321	~	~	~	~	~	~	~								
	CS341	~	~	~	✓	~	~	~	~							
	CS351	✓	~	~	~	~	~	~	~	~	~					
	CS352	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark										
	CS353	√	√	~	√											
3rd	CS381	✓	✓	~	√	✓	√	√								
Lev	CS391	~	~	~	~	~	~									
el	IT351	\checkmark	\checkmark	\checkmark												
	MM301	\checkmark	\checkmark	\checkmark						\checkmark			\checkmark			\checkmark
	MM302	\checkmark		\checkmark	\checkmark						\checkmark	\checkmark	\checkmark		\checkmark	
	MM321					\checkmark			\checkmark		\checkmark		\checkmark		\checkmark	\checkmark
	MM331							~	~	~	~	~				
	MATH30 1	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark								
	MM401								\checkmark		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	
	MM402								\checkmark		\checkmark	\checkmark				
	MM403				\checkmark	\checkmark	\checkmark						\checkmark	\checkmark	\checkmark	\checkmark
	MM411								\checkmark							
	MM412					\checkmark	1	\checkmark								
	WINHIZ												•			
4 t	MM421								\checkmark		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
^h Le	MM431					\checkmark			\checkmark							
vel	MM432			\checkmark	\checkmark	\checkmark		\checkmark								
	MM422					\checkmark	\checkmark	\checkmark	\checkmark	\checkmark						
	CS451					\checkmark			\checkmark		\checkmark		\checkmark		\checkmark	\checkmark
	CS452															
	CS471	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark								
	CS463								\checkmark		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	
	CS453								\checkmark		\checkmark	\checkmark				

IS417				\checkmark	\checkmark	\checkmark						\checkmark	\checkmark	\checkmark	\checkmark
IT371								\checkmark							
	a1	a2	a3	a4	a5	a6	a7	a8	a9	a1 0	a1 1	a12	a1 3	a1 4	a15

Program Matrix IV (Courses - Intellectual Skills)

	Course	b1	b2	b3	b4	b5	b6	b7	b8	b9	b1 0	b1 1	b1 2	b1 3	b1 4	b1 5	b1 6	b1 7
	CS141	✓	✓	✓	✓	\checkmark												
	IT101	~	✓	~														
	MATH10 1	✓	✓	~	~	~	~											
	MATH10	✓	✓	~	~	~	~											
	PHYS101	~	~	~	~													
	PHYS102	✓	✓	√	√													
	EE101	✓	✓	~	~	√	✓											
	EE102	✓	√	✓	√	~	~											
	HUM111	✓	✓															
1^{st}	HUM112	✓	✓	~														
Lev	HUM121	✓	✓	~														
<u>e</u> l	HUM122	✓	✓	~														
	HUM131	✓	✓															
	HUM132	✓	✓	~														
	HUM133	✓	✓	~	√	~												
	HUM141	✓	✓	✓	√													
	HUM142	✓	✓	~	~													
	HUM151	✓			~													
	HUM152	~	✓	~														
	HUM153		~	~														
	HUM154	~	~															
	CS201	✓	✓	~	~	~	~	✓	✓			√						
	CS211	~	~	~	~	>												
	CS241	~	√	√	√													
	IS201	~	✓	~	~	>												
	IS211	\checkmark																
	IS212	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark												
2n	IS221	\checkmark																
^d Lev	13221	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark											
/el	15231	\checkmark	\checkmark	\checkmark														
	IT251	\checkmark	\checkmark	\checkmark														
	CE221 MATH20																	
	1 MATH20	• ./	· ./	, /	./													
	2																	
	EE201	\checkmark	\checkmark	\checkmark	✓													
1	HUM231	✓	\checkmark	✓	√													

	HUM232	✓	✓	✓	~	✓												
	HUM241	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark											
	CS301	✓	✓	~	✓	✓	√											
	CS302	~	~	~	~	~												
	CS321	✓	~	~	~	~	~	~	~	~	~	√	√					
	CS341	~	~	~	~	~	~	~	~	~	√	√	✓					
	CS351	~	~	~	~	~	~	~	~	~								
	CS352	✓	~	✓	✓	~	~	~	~	~								
(J)	CS353	~	~															
3rd L	CS381			✓ ✓	✓ ✓	✓ ✓	~	✓ ✓	✓ ✓			,	✓ ✓	~	✓ ✓	✓ ✓	✓ ✓	
evel	CS391			✓ ✓	✓ ✓	✓ ✓		✓ ✓	✓ ✓			~	~		~	~	~	
	IT351			~	~	~	~	× 	~	~								
	MM301	\checkmark		\checkmark				~			\checkmark		\checkmark	\checkmark			\checkmark	
	MM302	\checkmark																
	MM321										\checkmark	,			\checkmark	\checkmark		
	MM331											~	~			~	~	
	MATH30 1		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark										
	MM401						\checkmark	\checkmark	\checkmark	\checkmark	\checkmark							
	MM402															\checkmark	\checkmark	\checkmark
	MM403												\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	
	MM411									\checkmark								
	MM412		1	1	1	1									1	1	\checkmark	\checkmark
	MM421		•	•	•	•					\checkmark	\checkmark	\checkmark	\checkmark	√	√	√	
	MM431					\checkmark	\checkmark	\checkmark	\checkmark									
	MM432			\checkmark	\checkmark	\checkmark	\checkmark					\checkmark	\checkmark	\checkmark	\checkmark			
4 th Le	MM422	\checkmark							\checkmark									
yvel					,	,	,						,	,	/			
	CS451				~	~	~						~	~	~			
	CS452									\checkmark	\checkmark	\checkmark	\checkmark					
	CS471		\checkmark	\checkmark	\checkmark	\checkmark												
	CS463										\checkmark	\checkmark	\checkmark					
	CS453								\checkmark	\checkmark	\checkmark	\checkmark						
	IS417						\checkmark	\checkmark	\checkmark	\checkmark								
	IT371	\checkmark				\checkmark	\checkmark	\checkmark				\checkmark						
		b1	b2	b3	b4	b5	b6	b7	b8	b9	b1 0	b1 1	b1 2	b1 3	b1 4	b1 5	b1 6	b1 7

Program MatrixV (Courses - Professional and Practical Skills)

	Course	c1	c2	c3	c4	c5	c6	c7	c8	c9	c1 0	c1 1	c1 2	c1 3	c1 4	c1 5	c1 6
	CS141	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark											
	IT101	\checkmark	\checkmark	\checkmark	\checkmark												
	MATH10 1	\checkmark	\checkmark	\checkmark							\checkmark	\checkmark					
	MATH10 2	\checkmark	\checkmark	\checkmark	\checkmark						\checkmark	\checkmark	\checkmark	\checkmark			
	 PHYS101	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark					\checkmark		\checkmark			
	DUVC102				\checkmark		\checkmark							\checkmark			
	FF101						\checkmark							\checkmark	\checkmark	\checkmark	
	EE101						\checkmark	\checkmark	\checkmark		\checkmark						
	EE102	\checkmark	\checkmark	\checkmark							\checkmark						
	HUM111	\checkmark	\checkmark	\checkmark													
1st L	HUM112	\checkmark	\checkmark	\checkmark													
evel	HUM121	- 		, ,													
	HUM122		· ./	• ./	./												
	HUM131	× /	× /	× /	Ň												
	HUM132	V (V (V (
	HUM133	√ √	✓ ✓	√ ∕	~												
	HUM141	\checkmark	~	\checkmark													
	HUM142	\checkmark	\checkmark	\checkmark													
	HUM151	\checkmark	\checkmark	\checkmark													
	HUM152	\checkmark	\checkmark	\checkmark	\checkmark												
	HUM153	\checkmark	\checkmark	\checkmark													
	HUM154	\checkmark															
	CS201	~	✓	~	✓												
	CS211	~	✓	~	✓	~	✓	~									
	CS241	✓ ✓	✓ ✓	✓ ✓	✓ ✓												
	IS201	✓ ✓	✓ ✓	✓ ✓	✓ ✓	✓ ✓	✓ ✓		~								
2 nd	IS211	✓ ✓	✓ ✓	✓ ✓	✓ ✓	✓ ✓	✓ ✓										
Lev	IS212		×	~	×	×	×										
el	IS221	· ./	./	./	./	./											
	IS231	• ./	• ./	• ./	·												
	IT251				×	×											
	CE221		×	×													
1	MATH20 1	v			~												

	MATH20 2	√	√	✓	√											
	 EE201	~			~											
	HUM231	~	~	~												
	HUM232	~	~	~												
	HUM241	✓	✓													
	CS301	\checkmark														
	CS302	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark									
	CS321	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark										
	CS341	\checkmark														
	C\$351	\checkmark	\checkmark													
	C5351	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark										
	<u>C5352</u>	\checkmark	\checkmark	\checkmark	\checkmark											
3rd	<u>CS353</u>	\checkmark														
Leve	CS381	\checkmark														
1	CS391	\checkmark														
	IT351			-		-	-									
	MM301	\checkmark				\checkmark	\checkmark		\checkmark			\checkmark		\checkmark	\checkmark	
	MM302							\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark			
	ND (221															
	1/11/1321			\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark						~	~
	MM331 MATH30	\checkmark														
<u> </u>	1															
	MM401									\checkmark	\checkmark	\checkmark		\checkmark		
	MM402								\checkmark	\checkmark	\checkmark	\checkmark				
	10.000				/	/	/	/	/		/					
	MM403				V	~	V	~	V	~	~					
	MM411	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark									\checkmark	\checkmark
4 th	MM412	\checkmark		\checkmark												
Lev	MM421						\checkmark									
el				,	,							-				
	MM431			√	√	√	√									
		1	1		./	\checkmark	\checkmark									
	MM432		\checkmark	\checkmark	v	-										
	MM432 MM422	\checkmark	\checkmark	\checkmark	v √	\checkmark	\checkmark	\checkmark								
	MM432 MM422 CS451	√	√ √ √	\checkmark	√ √	√ √	\checkmark	√ √								
	MM432 MM422 CS451	✓ 	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	√ √	√ √	√ √								

CS471							\checkmark	\checkmark	\checkmark	\checkmark						
CS463			\checkmark													
CS453		\checkmark	\checkmark	\checkmark												
IS417		\checkmark														
IT371	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark											
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c1 0	c1 1	c1 2	c1 3	c1 4	c1 5	c1 6

Program Matrix VI (Courses - Transferable Skills) Program Matrix VII (Aims - ILOs)

	Course	d1	d2	d3	d4	d5	d6	d7	d8	d9	d1 0	d1 1	d1 2	d1 3	d1 4	d1 5	d1 6
	CS141	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark										
	IT101	\checkmark	\checkmark	\checkmark	\checkmark												
	MATH10 1	\checkmark	\checkmark	\checkmark													
	MATH10 2	\checkmark	\checkmark	\checkmark													
	PHYS101	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark										
	PHYS102				\checkmark		\checkmark	\checkmark					\checkmark	\checkmark			
1:	EE101		\checkmark		\checkmark		\checkmark	\checkmark					\checkmark	\checkmark			
* Lev	EE102		\checkmark		\checkmark		\checkmark	\checkmark					\checkmark	\checkmark			
rel	HUM111	\checkmark															
	HUM112	\checkmark															
	HUM121	\checkmark															
	HUM122	\checkmark															
	HUM131	\checkmark															
	HUM132	\checkmark															
	HUM133	\checkmark															

		i i	1	i i	ı.	1	1	1	1	i -	I	I	1	1	1	I	
	HUM141	\checkmark															
	HUM142	\checkmark	\checkmark	\checkmark													
	HUM151	\checkmark	\checkmark	\checkmark													
	HUM152	\checkmark	\checkmark	\checkmark													
		\checkmark	\checkmark	\checkmark													
	HUM153	\checkmark	\checkmark	\checkmark													
	HUM154	√	√	√	√												
	CS201	✓	✓	√	✓	√	✓										
	CS211	✓	✓	√	√	√	√										
	IS201			✓	✓	√	✓										
	IS211	~	✓	✓	✓	√	✓										
	IS212	~		√	~	√	√										
	IS221		~	~	~	~	√										
2 nd	IS231	~	~	~	✓	√	~	~	~								
Lev	IT251	✓	✓	√	✓	√	✓										
el	CE221	✓ ✓	✓ ✓	✓ ✓	✓ ✓												
	MATH20 1	~	~	~	~												
	MATH20 2	~	~	~													
	EE201	~	~	~	~												
	HUM231	~	~	√	√	√	√	~									
	HUM232	✓	✓	√	✓	✓	√	✓	✓	✓							
	HUM241	~	~	√	~	√	~	~									
	CS301							\checkmark	\checkmark	\checkmark	\checkmark						
	CS302		\checkmark														
	CS321								\checkmark	\checkmark	\checkmark	\checkmark					
	CS341			\checkmark													
3 ¹	CS351								\checkmark	\checkmark	\checkmark	\checkmark					
^d Le	CS352											\checkmark	\checkmark	\checkmark	\checkmark		
vel	CENEN						./	./	./	./	./	./	./	./	./		
	CS381						v	v	v	v	v	v	↓	\checkmark	✓ ✓	\checkmark	
								,	,	,					,		
	CS391							\checkmark	\checkmark	\checkmark	√	√	√ ./	√ ./	√ ./	√ ./	
	11351			<u> </u>									V	V	V	×	
	MM301	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark								\checkmark	\checkmark	\checkmark
	MM302							\checkmark			\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		

	MM321								\checkmark								
	MM331																
	MATH30				,	,	,	,	/	,	,						
	1				V	V	V	V	V	V	V						
	MM401	\checkmark												\checkmark	\checkmark	\checkmark	\checkmark
	MM402									\checkmark	\checkmark	\checkmark	\checkmark				
	MM403				\checkmark												
	MM411										\checkmark						
	MM412					\checkmark											
	MM421										\checkmark						
	MM431		\checkmark	\checkmark	\checkmark	\checkmark											
Æ	MM432	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark											
lth Le	MM422					\checkmark											
vel	CS451						\checkmark	\checkmark	\checkmark	\checkmark							
	CS452	\checkmark															
	CS471							\checkmark	\checkmark	\checkmark	\checkmark						
	CS463		\checkmark														
	CS453							\checkmark	\checkmark	\checkmark	\checkmark						
	IS417								\checkmark	\checkmark	\checkmark	\checkmark					
	IT371						\checkmark	\checkmark	\checkmark	\checkmark	√ d1	√ d1	d1	d1	d1	d1	d1
		d1	d2	d3	d4	d5	d6	d7	d8	d9	0	1	2	3	4	5	6

Program Matrix (Courses -MM Programs)

	Course	a1	a2	a3	a4	a5	a6	a7	a8	a9	a1 0	a1 1	a12	a1 3	a1 4	a15
	CS141	√	√			√	√	√	√	√						
	IT101	~	√	√	~	~	√		~	√						
	MATH10	~	√													
	MATH10	✓	√	✓	✓	√										
	PHYS101	~	√	✓	✓	~	~									
	PHYS102	~	√	√	✓	~	√	~								
	EE101	✓	√	√	✓	~										
	EE102	~	√	√	✓	√	√	~	✓							
	HUM111	~														
$1^{\rm st}$	HUM112	√	√													
Lev	HUM121	~	√	√												
el	HUM122	~	√													
	HUM131	~	√													
	HUM132	~	~	✓												
	HUM133	~	~	✓	~	~	~									
	HUM141	~	~	~	~	>										
	HUM142	~	√	~	~	~										
	HUM151	~	~	~	~											
	HUM152		✓		~	~	~			~						
	HUM153	~	✓	~												
	HUM154	~	√													
	CS201	\checkmark	\checkmark													
	CS211	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark										
	CS241	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark										
	IS201		\checkmark	\checkmark	\checkmark			\checkmark	\checkmark				\checkmark			
	IC211	\checkmark				\checkmark	\checkmark				\checkmark			\checkmark	\checkmark	
2 ^{nc}	IS211	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark		\checkmark			\checkmark		\checkmark	\checkmark	
ⁱ Lev	IS212	\checkmark			\checkmark		\checkmark							\checkmark		
el	13221	\checkmark	\checkmark		\checkmark		\checkmark			\checkmark	\checkmark		\checkmark		\checkmark	
	IS231	✓	√	√	✓	√	√	✓								
	11251	✓	√	✓	\checkmark	✓	√	✓	\checkmark							
	CE221 MATH20	✓	√	√												
	1 Матн20	1	J	1	1	1										
	2			*	•	×										
	EE201	\checkmark	~	\checkmark												

	-		-	1	r	r	1	1	-			1	1	1		
	HUM231	\checkmark	\checkmark	\checkmark												
	HUM232	~		~	~	~	~									
	HUM241	~	√	~	√											
	CS301	✓	√	✓	✓	✓	✓	✓	~							
	CS302	~	~	✓	✓	✓	✓									
	CS321	✓	~	✓	~	~	~	~								
	CS341	~	\checkmark	~	~	~	~	~	~							
	CS351	~	√	~	√	~	√	~	~	~	~					
	CS352	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark										
	CS353	✓	√	√	√											
3^{rd}	CS381	√	√	√	√	√	√	√								
Lev	CS391	~	√	~	√	~	√									
el	IT351	\checkmark	\checkmark	\checkmark												
	MM301	\checkmark	\checkmark	\checkmark						\checkmark			\checkmark			\checkmark
	MM302	\checkmark		\checkmark	\checkmark						\checkmark	\checkmark	\checkmark		\checkmark	
	11111002											-			-	
	MM321					\checkmark			\checkmark		\checkmark		\checkmark		\checkmark	\checkmark
	MM331	,	,	,				<i>,</i>								
	MATH30 1	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark								
									/		/		/	/	/	
	MM401								V		v	V	V	v	V	
	MM402								\checkmark		\checkmark	\checkmark				
	MM403				5	5	1						J	5	1	1
	101101405				, v	, v	, v						•	, v	•	
	MM411								\checkmark							
	MM412					\checkmark										
	MM421								\checkmark		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
4^{th}	MM431						\checkmark						\checkmark			\checkmark
Levi							/	/						/	/	/
el	MM432						\checkmark	~						~	V	V
	MM422					\checkmark		\checkmark	\checkmark	\checkmark						
	CS/151					5			1		1		1		1	5
	CS452					×			v		Ň		v			v
	CC 451	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark								
	C5471															
	CS463			<u> </u>	<u> </u>	<u> </u>	<u> </u>		\checkmark		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	
	CS453								\checkmark		\checkmark	\checkmark				
	20100								-							
	IS417				\checkmark	\checkmark	\checkmark						\checkmark	\checkmark	\checkmark	\checkmark

IT371								\checkmark							
	a1	a2	a3	a4	a5	a6	a7	a8	a9	a1 0	a1 1	a12	a1 3	a1 4	a15

	Course	b1	b2	b3	b4	b5	b6	b7	b8	b9	b1 0	b1 1	b1 2	b1 3	b1 4	b1 5	b1 6	b17
	CS141	✓	✓	✓	✓	✓												
	IT101	~	~	~														
	MATH10 1	~	~	~	~	~	~											
	MATH10	~	~	~	✓	~	~											
	PHYS101	~	✓	✓	1													
	PHYS102	~	~	~	~													
	EE101	~	~	~	~	~	~											
	EE102	~	~	~	~	~	~											
	HUM111	√	~															
	HUM112	~	~	~														
1 st Level	HUM121	~	~	~														
	HUM122	~	~	~														
	HUM131	✓	✓															
	HUM132	~	~	~														
	HUM133	~	~	~	~	~												
	HUM141	✓	√	√	✓													
	HUM142	√	~	~	~													
	HUM151	~			~													
	HUM152	~	~	~														
	HUM153		~	~														
	HUM154	~	~															
	CS201	✓	~	~	~	✓	~	~	~			✓						
	CS211	✓	✓	✓	✓	✓												
	CS241	✓	✓	✓	✓													
	IS201			\checkmark		\checkmark												
	IS211			\checkmark		\checkmark	\checkmark				\checkmark							
2 nd Level	IS212	\checkmark			\checkmark		\checkmark		\checkmark		\checkmark							
	16001				\checkmark	\checkmark		\checkmark	\checkmark		\checkmark							
	15221	\checkmark		\checkmark		\checkmark		\checkmark										
	13231 IT251	\checkmark	\checkmark	\checkmark														
	CE221	\checkmark	\checkmark	\checkmark														

	MATH20	\checkmark	\checkmark	\checkmark														
	1 MATH20																	
	2	×	×	×	×													
	EE201	\checkmark	\checkmark	\checkmark	\checkmark													
	HUM231	✓	√	√	~													
	HUM232	✓	√	√	✓	√												
	HUM241	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark											
	CS301	✓	√	√	✓	√	√											
	CS302	~	√	√	~	√												
	CS321	~	√	√	~	√	√	√	√	√	~	~	~					
	CS341	✓	√	✓	~	✓	√	✓	~	√	~	~	✓					
	CS351	~																
	CS352	✓	√	√	✓	√	√	√	√	√								
	CS353	~	~															
	CS381			~	✓	~	√	~	✓				✓	✓	✓	✓	✓	
3rd Level	CS391			~	✓	~		~	√			✓	~		√	√	√	
	IT351			√	~	√	√	√	√	√								
	MM301	1		1				\checkmark			1		1	1			1	
	101101301	, v		•							, v		•	v			•	
	MM302	\checkmark																
	MM321		1	1	√	1	1				\checkmark				\checkmark	\checkmark		
	MM331																	
	MATH30 1		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark										
	ND 4401						./	./	./	./	./							
	MM402						v	v	v	v	v					1	1	1
	MM403												\checkmark	\checkmark	\checkmark			
																		Ĺ,
	MM411									\checkmark								
	MM412		\checkmark	\checkmark	\checkmark	\checkmark									\checkmark	\checkmark	\checkmark	\checkmark
	MM421										\checkmark							
Ath Loval	MM431					\checkmark	\checkmark	\checkmark	\checkmark									
4. Level				,		,	,						,		,			
	MM432			~	~	~	~					~	~	~	~			
	MM422	\checkmark							\checkmark									
	CS451				\checkmark	\checkmark	\checkmark						\checkmark	\checkmark	\checkmark			
	CS452									\checkmark	✓	1	\checkmark					
	CS471		\checkmark	\checkmark	\checkmark	\checkmark												
	CS463										\checkmark	\checkmark	\checkmark					

CS453								\checkmark	\checkmark	\checkmark	\checkmark						
IS417						\checkmark	\checkmark	\checkmark	\checkmark								
IT371	\checkmark				\checkmark	\checkmark	\checkmark				\checkmark						
	b1	b2	b3	b4	b5	b6	b7	b8	b9	b1 0	b1 1	b1 2	b1 3	b1 4	b1 5	b1 6	b17

	Course	c1	c2	c3	c4	c5	c6	c7	c8	с9	c1 0	c1 1	c1 2	c1 3	c1 4	c1 5	c1 6
	CS141	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark											
	IT101	✓	✓	~	✓												
	MATH10 1	~	~	~													
	MATH10 2	√	✓	✓	~												
	PHYS101	√	√	✓	~	√	~										
	PHYS102	√	√	√	✓	√											
	EE101	√	√	√	✓	√											
	EE102	√	√	√	~	√											
	HUM111	\checkmark	\checkmark	\checkmark							\checkmark						
	HUM112	\checkmark	\checkmark	\checkmark													
st Le	HUM121	\checkmark	\checkmark	\checkmark													
vel	HUM122	\checkmark	\checkmark	\checkmark													
	HUM131	\checkmark	\checkmark	\checkmark	\checkmark												
	HUM132	\checkmark	\checkmark	\checkmark													
	HUM133	\checkmark	\checkmark	\checkmark	\checkmark												
	HUM141	\checkmark	\checkmark	\checkmark													
	HUM142	\checkmark	\checkmark	\checkmark													
	HUM151	\checkmark	\checkmark	\checkmark													
	HUM152	\checkmark	\checkmark	\checkmark	\checkmark												
	HUM153	\checkmark	\checkmark	\checkmark													
	HUM154	\checkmark															
	CS201	✓	✓	✓	✓												
	CS211	~	~	~	~	~	√	~									
	CS241	~	~	~	✓												
	IS201		\checkmark		\checkmark	\checkmark		\checkmark		\checkmark							
	IS211	\checkmark	\checkmark		\checkmark		\checkmark										
2nd I	IS212		√	✓		✓	√	✓									
eve	IS221	\checkmark		\checkmark	\checkmark		\checkmark	\checkmark									
	IS231			\checkmark		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark							
	IT251	~	~	~	~	~											
	CE221	✓	✓	✓													
	MATH20 1	✓			✓												
	MATH20 2	✓	✓	✓	~												

	EE 001	√			✓											
	HUM231	~	~	~												
	HUM232	✓	✓	✓												
	HUM241	~	~													
	CS301	\checkmark														
	C5301	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark									
	C5302	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark										
	CS321	\checkmark														
	CS341	\checkmark	\checkmark													
	CS351															
	CS352	· /	· /	× /	× /	•										
3	CS353	v (~	~	~											
rd L	CS381	\checkmark														
evel	CS391	\checkmark														
	IT351	\checkmark														
															,	
	MM301	~				~	~		~			~		~	~	
	MM302							\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark			
	MM321	\checkmark			\checkmark										\checkmark	\checkmark
	MN 4221		./	./	./	./	./	./								
	MATH30	\checkmark														
	1															
	MM401									\checkmark	\checkmark	\checkmark		\checkmark		
	MM402								\checkmark	\checkmark	\checkmark	\checkmark				
					/	/	/		/	/	/					
	MM403				v	V	v		×	v	v					
	MM411	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark									\checkmark	\checkmark
	MM412	\checkmark		\checkmark												
4 th L	MM421						\checkmark									
evel					,	,										
	MM431			~	\checkmark	~	~									
	MM432		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark									
	MM422	\checkmark														
	CS451		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark								
									,	,	,					
	CS452								√	√	~					
	CS471							\checkmark	\checkmark	\checkmark	\checkmark					

CS463			\checkmark													
CS453		\checkmark	\checkmark	\checkmark												
IS417		\checkmark														
IT371	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark											
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c1 0	c1 1	c1 2	c1 3	c1 4	c1 5	c1 6

	Course	d1	d2	d3	d4	d5	d6	d7	d8	d9	d1 0	d1 1	d1 2	d1 3	d1 4	d1 5	d1 6
	CS141	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark										
	IT101	~	~	✓	~												
	MATH10 1	~		~													
	MATH10	~		✓													
	2 PHYS101	✓	✓	✓	~	√	✓										
	PHYS102	~	~	~	~	1	~										
	EE101	~	~	✓	~	√	~										
	EE102	~	~	~	~	√											
	HUM111	\checkmark															
	HUM112	\checkmark															
1st]	HUM121	\checkmark															
[eve]	HUM122	\checkmark															
_	LIUM121	\checkmark															
	110101131	\checkmark															
	HUM132	\checkmark															
	HUM133	\checkmark															
	HUM141	\checkmark	\checkmark	\checkmark													
	HUM142	\checkmark	\checkmark	\checkmark													
	HUM151																
	HUM152	· /	· /	× /													
	HUM153	v v	×	×													
	HUM154	V	V	V													
	CS201	✓ ✓	✓ ✓	✓ ✓	<i>✓</i>												
	CS211	× (× (V (× (× (× (
	CS241	× 	× 	V /	× 	~	V (
	IS201	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark		\checkmark	~						
	IS211	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark		\checkmark	\checkmark						
2 nd	IS212	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark		\checkmark	\checkmark						
Lev	IS221	\checkmark	\checkmark	\checkmark	\checkmark				\checkmark		\checkmark				\checkmark		
re1	IS231		~	~	~	√	~	~	~								
	IT251	~	~	~	~	√	~										
	CE221	~	✓	✓	~												
	MATH20 1	~	~	~	~	1											
	MATH20 2	~	~	~	1	1	~										
	EE201	~	~	~	1	1											

	HUM231	✓	✓	✓	✓	✓	✓	✓									
	HUM232	~	✓	~	~	1	~	~	~	~							
	HUM241	~	~	✓	✓	✓	✓	~									
	CS301							\checkmark	\checkmark	\checkmark	\checkmark						
			,	,	,	,	,										
	CS302		\checkmark														
	CS321								\checkmark	\checkmark	\checkmark	\checkmark					
	CS341			\checkmark													
	CS351								\checkmark	\checkmark	\checkmark	\checkmark					
	CS352											\checkmark	\checkmark	\checkmark	\checkmark		
3 rd	CS353						\checkmark										
' Lev	CS381												\checkmark	\checkmark	\checkmark	\checkmark	
'el	CS391							\checkmark									
	IT351												\checkmark	\checkmark	\checkmark	\checkmark	
	MM301	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark								\checkmark	\checkmark	\checkmark
	NR (202							./				./	./	./			
	MM302							~			~	~	~	V	V		
	MM321								\checkmark								
	MM331		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark										
	MATH30 1				\checkmark												
	-													,	,		í,
	MM401	\checkmark												\checkmark	\checkmark	\checkmark	_ ✓
	MM402									\checkmark	\checkmark	\checkmark	\checkmark				
	MM403				\checkmark												
	MM411										\checkmark						
	MM412					\checkmark											
	MM421										\checkmark						
4 th Le	MM431		\checkmark	\checkmark	\checkmark	\checkmark											
vel	MM432	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark											
	MM422					\checkmark											
	CS451						1	1	1	1							
	C6452	./	./	./	./	./	./	./	./	./							
	-	v	v	v	v	v	v	· ·	v /	v ,	,						
	CS471							√	√	√	√						
	CS463		\checkmark														

CS453							\checkmark	\checkmark	\checkmark	\checkmark						
IS417								\checkmark	\checkmark	\checkmark	\checkmark					
IT371						\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark					
	d1	d2	d3	d4	d5	d6	d7	d8	d9	d1 0	d1 1	d1 2	d1 3	d1 4	d1 5	d1 6

Program Matrix VII (Aims - ILOs)

TEACHING AND LEARNING METHODS

			Teac	hing Me	and l ethod	Lear Is	ning	
	Intended Learning Outcomes (ILO's) of the program	Le ct ur e	Tut ori als exe rcis es	Pr ac tic al ex er cis es	W or ks ho ps	Pr oj ec ts	C as e st ud y	D at co lle cti on
	a1. Understand the essential mathematics relevant to computer science and multimedia.	\checkmark	\checkmark					
K	a2. Understand high-level programming languages.	\checkmark	\checkmark	\checkmark				
n o W	a3. Demonstrate basic knowledge and understanding of a core of mathematical analysis, algebra, applied mathematics and statistics.	\checkmark			\checkmark			
le d g	a4. Interpret data qualitatively and/or quantitatively.	\checkmark	\checkmark					
e a n d	a5. Know and understand the principles and techniques of a number of application areas informed by the research directions of multimedia.		\checkmark				\checkmark	
U n d e	a6. Show a critical understanding of the principles of artificial intelligence, image, and pattern recognition, computer vision and Human computer Interaction.	\checkmark					\checkmark	\checkmark
r st a n	a7. Understand the fundamental topics in computer systems, including hardware architectures and operating systems.	\checkmark	\checkmark	\checkmark		\checkmark		\checkmark
d i n	a8. Select advanced topics to provide a deeper understanding of some aspects of object-oriented analysis and design, and software engineering.	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
g	a9. Select advanced topics to provide a deeper understanding of some aspects of the artificial intelligence, image processing, and computer graphics and animation.	\checkmark	\checkmark	\checkmark	\checkmark			\checkmark

			Teac	hing Me	and] ethod	Lear Is	ning	
	Intended Learning Outcomes (ILO's) of the program	Le ct ur e	Tut ori als exe rcis es	Pr ac tic al ex er cis es	W or ks ho ps	Pr oj ec ts	C as e st ud y	D at co lle cti on
	a10. Demonstrate strong knowledge of fundamentals of programming and the construction of computer-based systems.	~	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	~
	a11. Provide a deeper understanding of legal, professional and moral aspects of the exploitation of computing.	\checkmark	\checkmark			\checkmark		Ń
	a12. Know the tools, practices and methodologies used in the specification, design, implementation and critical evaluation of multimedia systems.	\checkmark	\checkmark	\checkmark		\checkmark		\checkmark
	a13. Know the methods used in defining and assessing criteria for measuring the extent to which a computer system is appropriate for its current deployment and future evolution.	\checkmark	\checkmark	\checkmark		\checkmark		
	a14. Know the current and underlying technologies that support computer processing and inter-computer communication.	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
	a15. Understand of the principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	\checkmark			\checkmark		\checkmark	
I n t	b1. Discuss traditional and nontraditional problems, set goals towards solving them, and observe results.		\checkmark	\checkmark			\checkmark	
ei le c	b2. Compare between (methods, techniquesetc).		\checkmark			\checkmark	\checkmark	
t u a	b3. Apply classifications of (data, results, methods, techniques etc.).		\checkmark			\checkmark	\checkmark	
l S	b4. Analyze attributes, components, relationships, patterns, main ideas, and errors.		\checkmark				\checkmark	

			Teac	hing M	and] ethod	Lear Is	ning	
	Intended Learning Outcomes (ILO's) of the program	Le ct ur e	Tut ori als exe rcis es	Pr ac tic al ex er cis es	W or ks ho ps	Pr oj ec ts	C as e st ud y	D at co lle cti on
k il	b5. Summarize the proposed solutions and their results.			\checkmark		\checkmark		
ls	b6. Restrict solution methodologies upon their results.			\checkmark		\checkmark		
	b7. Establish criteria, and verify solutions.			\checkmark		\checkmark	\checkmark	
	b8. Show a range of solutions and critically evaluate and justify proposed design solutions.		\checkmark	\checkmark				
	b9. Analyze computer science problems with pressing commercial or industrial constraints.			\checkmark		\checkmark	\checkmark	
	b10. Generate an innovative design to solve a problem containing a range of commercial and industrial constraints.			\checkmark		\checkmark		
	b11. Create and/or justify designs to satisfy given requirements (synthesis, evaluation, application).		\checkmark	\checkmark				
	b12. Apply the concepts, principles, theories and practices underpinning computing as an academic discipline.			\checkmark			\checkmark	\checkmark
	b13. Apply knowledge and methods from a variety of sources		\checkmark	\checkmark		\checkmark		
	b14. Analyze requirements of information manipulation and communication problems and design solutions based around appropriate integration of multimedia, Internet and computer software technologies		\checkmark	~		\checkmark	~	
	b15. Plan, conduct and report on a program of work covering multiple system lifecycle stages and leading to an end-product, with evaluation of the end-product, and the process and technologies employed.		√	~	~		√	

			Teac	hing M	and] ethod	Lear Is	ning	
	Intended Learning Outcomes (ILO's) of the program	Le ct ur e	Tut ori als exe rcis es	Pr ac tic al ex er cis es	W or ks ho ps	Pr oj ec ts	C as e st ud y	D at a co lle cti on
	b16. Synthesize ideas, proposals and designs effectively using rational and reasoned arguments for presentation to a range of audiences.		\checkmark	\checkmark		\checkmark		
	b17. Correlate the results of tests to investigate the functionality of computer systems.		\checkmark	\checkmark		\checkmark		
	c1. Use appropriate programming languages and design methodologies.		\checkmark	\checkmark		\checkmark		
P r o f e	c2. Use appropriate web-based systems, tools and design methodologies.		\checkmark	\checkmark		\checkmark		
	c3. Specify, design, and implement computer- based systems.		\checkmark	\checkmark		\checkmark		
	c4. Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds, including text, images, sound, and video.	~					\checkmark	<
si o n a	c5. Apply the principles of human-computer interaction to the evaluation and construction of a wide range of materials including user interfaces, web pages, and multimedia systems.	\checkmark	\checkmark	\checkmark		\checkmark		
a I S k il Is	c6. Deploy effectively the tools used for the construction and documentation of software, with particular emphasis on understanding the whole process involved in using computers to solve practical problems.	\checkmark	~		\checkmark			~
	c7. Make effective use of general computing facilities, plan and manage a project to complete within budget and schedule.		\checkmark	\checkmark	\checkmark			\checkmark
	c8. Manage the need for continuing professional development in recognition of the need for lifelong learning.		\checkmark	\checkmark	\checkmark			\checkmark

			Teac	hing Me	and] ethod	Lear Is	ning	
	Intended Learning Outcomes (ILO's) of the program	Le ct ur e	Tut ori als exe rcis es	Pr ac tic al ex er cis es	W or ks ho ps	Pr oj ec ts	C as e st ud y	D at co lle cti on
	c9. Operate computing equipment efficiently, taking into account its logical and physical properties.	~			\checkmark			\checkmark
	c10. Apply tools and techniques for the design and development of applications.		\checkmark	\checkmark		\checkmark	\checkmark	
	c11. Apply Internet technology		\checkmark		\checkmark			\checkmark
	c12. Prepare technical reports and presentations	\checkmark			\checkmark			\checkmark
	c13. Use appropriate diagrammatic and formal written notations in design workand in reports	\checkmark			\checkmark			
	c14. Use a programming language and a variety of software tools and environments to construct, test and document software applications, which may include multimedia components.		\checkmark	\checkmark		\checkmark		
	c15. Use multimedia production systems	\checkmark			\checkmark			\checkmark
	c16. Apply software engineering and application technologies to achieve effective communication and interaction with end users		\checkmark	\checkmark		\checkmark		~
G	d1. Communicate effectively by oral, written and visual means.		\checkmark	\checkmark		\checkmark		
e n e	d2. Work effectively as an individual and as a member of a team.		\checkmark			\checkmark		
r a l	d3. Collaborate effectively within multidisciplinary team.		\checkmark			\checkmark		
l S k	d4. Work in stressful environment and within constraints.			\checkmark		\checkmark		
il ls	d5. Prepare and present seminars to a professional standard.		\checkmark	\checkmark		\checkmark		

		Teac	hing Me	and l ethod	Learning ls				
Intended Learning Outcomes (ILO's) of the program	Le ct ur e	Tut ori als exe rcis es	Pr ac tic al ex er cis es	W or ks ho ps	Pr oj ec ts	C as e st ud y	D at a co lle cti on		
d6. Prepare technical reports, and a dissertation, to a professional standard; use IT skills and display mature computer literacy.		\checkmark	\checkmark		\checkmark				
d7. Demonstrate efficient IT capabilities.		\checkmark	\checkmark	\checkmark	\checkmark				
d8. Lead and motivate individuals.		\checkmark			\checkmark				
d9. Manage tasks and resources.		\checkmark	\checkmark		\checkmark				
d10. Search for information and adopt life-long self-learning.		\checkmark	\checkmark		\checkmark		\checkmark		
d11. Acquire entrepreneurial skills.			\checkmark		\checkmark				
d12. Manage one's own learning and development.		\checkmark	\checkmark		\checkmark				
d13. Prepare their work in the form of reports.		\checkmark	\checkmark		\checkmark				
d14. Communicate effectively with team members, managers and costumers.		\checkmark	\checkmark		\checkmark				
d15. Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension.		\checkmark	\checkmark						
d16. Develop a range of fundamental research skills, through the use of online resources, technical repositories and library-based material.		\checkmark	\checkmark		\checkmark		\checkmark		

		Assessment methods									
	Intended Learning Outcomes (ILO's) of the program					O r a l E x a m					
	a1. Understand the essential mathematics relevant to computer science and multimedia.	~	\checkmark								
	a2. Use high-level programming languages.	\checkmark	\checkmark	\checkmark	\checkmark						
	a3. Demonstrate basic knowledge and understanding of a core of mathematical analysis, algebra, applied mathematics and statistics.	\checkmark	\checkmark		\checkmark						
	a4. Interpreting and analyzing data qualitatively and/or quantitatively.	\checkmark	\checkmark		\checkmark						
Kn	a5. Know and understand the principles and techniques of a number of application areas informed by the research directions of multimedia.	<	\checkmark		\checkmark						
owi edg e and	a6. Show a critical understanding of the principles of artificial intelligence, image, and pattern recognition, computer vision and Human computer Interaction.	\checkmark	\checkmark								
Un der sta ndi	a7. Understanding of fundamental topics in computer systems, including hardware architectures and operating systems.	~	~	~	\checkmark						
ng	a8. Select advanced topics to provide a deeper understanding of some aspects of object-oriented analysis and design, and software engineering.	\checkmark	\checkmark		\checkmark						
	a9. Select advanced topics to provide a deeper understanding of some aspects of the artificial intelligence, image processing, and computer graphics and animation.	\checkmark	\checkmark	~	\checkmark						
	a10. Demonstrate strong knowledge of fundamentals of programming and the construction of computer-based systems.	~	~	~	~						
	a11. Provide a deeper understanding of legal, professional and moral aspects of the exploitation of computing.	\checkmark	\checkmark		\checkmark						

			Ass	essm etho	lent ds	
	Intended Learning Outcomes (ILO's) of the program	F i n a l E x a m	M i d - T e r m E x a m	P r a t i c a l E x a m	C l s W o r k	O r a I E x a m
	a12. Knowledge of the tools, practices and methodologies used in the specification, design, implementation and critical evaluation of multimedia systems.	~	\checkmark	~	\checkmark	
	a13. Knowledge of the methods used in defining and assessing criteria for measuring the extent to which a computer system is appropriate for its current deployment and future evolution.	\checkmark	\checkmark	~	\checkmark	
	a14. Knowledge and understanding of the current and underlying technologies that support computer processing and inter-computer communication.	\checkmark	\checkmark	\checkmark	\checkmark	
	a15. Knowledge and understanding of the principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	~	\checkmark		\checkmark	
	b1. Define traditional and nontraditional problems, set goals towards solving them, and observe results.	\checkmark	\checkmark		\checkmark	
	b2. Perform comparisons between (methods, techniquesetc).	\checkmark	\checkmark		\checkmark	
T 4	b3. Perform classifications of (data, results, methods, techniques etc.).	\checkmark	\checkmark		\checkmark	
elle ctu	b4. Identify attributes, components, relationships, patterns, main ideas, and errors.	\checkmark	\checkmark		\checkmark	
al Ski	b5. Summarize the proposed solutions and their results.	\checkmark	\checkmark		\checkmark	
lls	b6. Restrict solution methodologies upon their results.	\checkmark	\checkmark		\checkmark	
	b7. Establish criteria, and verify solutions.	\checkmark	\checkmark		\checkmark	
-	b8. Identify a range of solutions and critically evaluate and justify proposed design solutions.	\checkmark	\checkmark		\checkmark	
	b9. Solve computer science problems with pressing commercial or industrial constraints.	\checkmark	\checkmark		\checkmark	

			Ass	essm etho	ient ds	
	Intended Learning Outcomes (ILO's) of the program				C l s s W o r k	O r a E x a m
	b10. Generate an innovative design to solve a problem containing a range of commercial and industrial constraints.	\checkmark	\checkmark		\checkmark	
	b11. Create and/or justify designs to satisfy given requirements (synthesis, evaluation, application).	\checkmark	\checkmark	\checkmark	\checkmark	
	b12. Apply the concepts, principles, theories and practices underpinning computing as an academic discipline.	\checkmark	\checkmark	\checkmark	\checkmark	
	b13. Integrate and apply knowledge and methods from a variety of sources	\checkmark	\checkmark		\checkmark	
	b14. Analyse requirements of information manipulation and communication problems and design solutions based around appropriate integration of multimedia, Internet and computer software technologies	~	\checkmark		\checkmark	
	b15. Plan, conduct and report on a program of work covering multiple system lifecycle stages and leading to an end- product, with evaluation of the end-product, and the process and technologies employed.	\checkmark	~	~	~	
	b16. Synthesize ideas, proposals and designs effectively using rational and reasoned arguments for presentation to a range of audiences.	\checkmark	~		\checkmark	
	b17. Generate and evaluate the results of tests to investigate the functionality of computer systems.				\checkmark	
P r	c1. Use appropriate programming languages and design methodologies.	\checkmark	\checkmark	\checkmark	\checkmark	
o f	c2. Use appropriate web-based systems, tools and design methodologies.	\checkmark	\checkmark	\checkmark	\checkmark	
s si	c3. Specify, design, and implement computer-based systems.	\checkmark	\checkmark	\checkmark	\checkmark	

		Assessment methods								
	Intended Learning Outcomes (ILO's) of the program	F i a l E x a m	M i - T e r m E x a m	P r c t i c a l E x a m	Cl as Wo rk	O r a E x a m				
o n a l	c4. Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds, including text, images, sound, and video.			\checkmark	~					
S k il ls	c5. Apply the principles of human-computer interaction to the evaluation and construction of a wide range of materials including user interfaces, web pages, and multimedia systems.	\checkmark	\checkmark	\checkmark	\checkmark					
	c6. Deploy effectively the tools used for the construction and documentation of software, with particular emphasis on understanding the whole process involved in using computers to solve practical problems.	\checkmark	~		~					
	c7. Make effective use of general computing facilities, plan and manage a project to complete within budget and schedule.	\checkmark	\checkmark	\checkmark	\checkmark					
	c8. Appreciate and manage the need for continuing professional development in recognition of the need for lifelong learning.	\checkmark	\checkmark	\checkmark	\checkmark					
	c9. Operate computing equipment efficiently, taking into account its logical and physical properties.	\checkmark	\checkmark		\checkmark					
	c10. Apply tools and techniques for the design and development of applications.	\checkmark	\checkmark	\checkmark	\checkmark					
	c11. Apply Internet technology	\checkmark	\checkmark		\checkmark					
	c12. Prepare technical reports and presentations	\checkmark	\checkmark							
	c13. Use appropriate diagrammatic and formal written notations in design workand in reports	\checkmark	\checkmark							
	c14. Use a programming language and a variety of software tools and environments to construct, test and document software applications, which may include multimedia components.	\checkmark	\checkmark	\checkmark	\checkmark					

			Ass m	essm etho	lent ds	
	Intended Learning Outcomes (ILO's) of the program	F i a I E x a m	M d- Term Exam	P r a t i c a l E x a m	Cl ss Wo rk	O r a E x a m
	c15. Use multimedia production systems	\checkmark	\checkmark		\checkmark	
	c16. Apply ISE techniques to achieve effective communication and interaction with end users	\checkmark	\checkmark	\checkmark	\checkmark	
	d1. Communicate effectively by oral, written and visual means.	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
	d2. Work effectively as an individual and as a member of a team.			\checkmark	\checkmark	
	d3. Collaborate effectively within multidisciplinary team.			\checkmark	\checkmark	
	d4. Work in stressful environment and within constraints.			\checkmark	\checkmark	
	d5. Prepare and present seminars to a professional standard.			\checkmark	\checkmark	
Ger	d6. Prepare technical reports, and a dissertation, to a professional standard; use IT skills and display mature computer literacy.		\checkmark		\checkmark	
ıeral	d7. Demonstrate efficient IT capabilities.		\checkmark	\checkmark	\checkmark	
Skil	d8. Lead and motivate individuals.			\checkmark	\checkmark	
SI	d9. Manage tasks and resources.	\checkmark	\checkmark	\checkmark	\checkmark	
	d10. Search for information and adopt life-long self-learning.	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
	d11. Acquire entrepreneurial skills.			\checkmark	\checkmark	
	d12. Manage one's own learning and development.			\checkmark	\checkmark	
	d13. Prepare their work in the form of reports.			\checkmark	\checkmark	
	d14. Communicate effectively with team members, managers and costumers.			\checkmark	\checkmark	
	d15. Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension.	\checkmark	\checkmark	\checkmark	\checkmark	

Intended Learning Outcomes (ILO's) of the program	Assessment methods				
	F i a l E x a m	M i d - T e r m E x a m	P r a t i c a l E x a m	C l s w o r k	O r a l E x a m
d16. Develop a range of fundamental research skills, through the use of online resources, technical repositories and library- based material.			\checkmark	\checkmark	

Program coordinator: Prof. Dr. Khaled Fathi Hussain

Signature:

Approved by Dean: Prof. Dr. Taysir Hassan A. Soliman

Signature: