Menoufia University
Faculty of Electronic Engineering
Computer Science and
Engineering Dept.

جامعة المنوفيــــــــة
كلية الهندسة الالكترونيــة
قسم هندسة وعلوم الحاسبات

Computer Science and Engineering Program Specification

A- Basic Information

1- Program title: Bachelor of Computer Science and Engineering

2- Program type: Single

3- Department (s): Computer Science and Engineering

4- Coordinator: Prof. Nawal Ahmed El-Fishawy

5- External evaluator(s): Prof. Fawzy Ali Torky

6- Last date of program specifications approval: /   /2012

B- Professional Information

1- Program aims

The program aims are to:

- Have strong foundations in mathematics, basic science and engineering concepts.
- Understand different techniques to do analysis for various engineering problems.
- Conduct experiments and to analyze and interpret data.
- Acquire methods and procedures to design a system or process to meet required needs.
- Work within multi-disciplinary teams.
- Identify, formulate and solve engineering problems.
- Has understanding of professional and ethical responsibilities.
- Equipped with good communication skills.
- Consider and avoid the detrimental impact of engineering solutions within social or global measures.
- Know how to use the techniques, skills and modern engineering tools necessary for engineering practice.
- Know the technology required to build computing systems of all types; including both embedded and stand-alone microprocessors and all types of computers.
- Have acquired a good knowledge of the hardware, all the way from the circuits to the architecture, but also necessarily deals with the operating systems and compilers for that hardware. The areas of specialization within Computer Engineering are logic design and computer systems and software.
- Have an integrated understanding of the scientific and engineering principles underlying the major elements of the field of computer engineering, namely electrical, electronic, digital circuits and microprocessors and its applications.

2- Intended Learning Outcomes (ILOs)

Computer science and engineering is a field that requires many skills. In addition to the general attributes of a computer engineer, graduate students must have knowledge and understanding of the field of computer science and engineering, intellectual skills, practical and professional skills, and General and Transferable Skills.

A.   Knowledge and Understanding:

The graduates of computer science and engineering program should demonstrate knowledge and understanding of:

a1. Concepts and theories of mathematics and sciences, appropriate to the computer science and engineering.

a2. Basics of information and communication technology (ICT)

a3. Characteristics of engineering materials related to the computer science and engineering.

a4. Principles of design including elements design, process and/or a system related to specific computer science and engineering.

a5. Methodologies of solving engineering problems, data collection and interpretation

a6. Quality assurance systems, codes of practice and standards, health and safety requirements and environmental issues.

a7. Business and management principles relevant to engineering.

a8. Current engineering technologies as related to computer science and engineering.

a9. Topics related to humanitarian interests and moral issues.

a10. Technical language and report writing.

a11. Professional ethics and impacts of engineering solutions on society and environment.

a12. Contemporary engineering topics.

a13. Engineering principles in the fields of logic design, circuit analysis, machine and assembly languages, computer organization and architectures, memory hierarchy, advanced computer architectures, embedded systems, signal processing, operating systems, real-time systems and reliability analysis.

a14. Quality assessment of computer systems.

a15. Principles of Analyzing and design of electronic circuits and components.

a16. Related research and current advances in the field of computer software and hardware.

a17. Technologies of data, image and graphics representation and organization on computer storage media.

a18. Modern trends in information technology and its fundamental role in business enterprises.

a19. Methods of fabrication of Integrated circuits.

B.   *Intellectual skills:*

The graduates of computer science and engineering program should be able to:

b1. Select appropriate mathematical and computer-based methods for modeling and analyzing problems.

b2. Select appropriate solutions for engineering problems based on analytical thinking.

b3. Think in a creative and innovative way in problem solving and design.

b4. Combine, exchange, and assess different ideas, views, and knowledge from a range of sources.

b5. Assess and evaluate the characteristics and performance of components, systems and processes.

b6. Investigate the failure of components, systems, and processes.

b7. Solve engineering problems, often on the basis of limited and possibly contradicting information.

b8. Select and appraise appropriate ICT tools to a variety of engineering problems.

b9. Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact.

b10. Incorporate economic, societal, environmental dimensions and risk management in design.

b11. Analyze results of numerical models and assess their limitations.

b12. Create systematic and methodic approaches when dealing with new and advancing technology.

b13. Develop innovative solutions for the practical industrial problems.

b14. Select the appropriate mathematical tools, computing methods, design techniques for modeling and analyzing computer systems.

b15. Select, synthesize, and apply suitable IT tools to computer engineering problems.

b16. Proposing various computer-based solutions to business system problems.

b17. Cost-benefit analysis should be performed especially in sensitive domains where direct and indirect costs are involved.

b18. Identifying symptoms in problematic situations.

b19. Innovating solutions based on non-traditional thinking and the use of latest technologies

b20. Capability of integrating computer objects running on different system configurations.

C.   *Practical and Professional Skills:*

The graduates of computer science and engineering program should be able to:

c1. Apply knowledge of mathematics, science, information technology, design, business context and engineering practice integrally to solve engineering problems.

c2. Professionally merge the engineering knowledge, understanding, and feedback to improve design, products and/or services.

c3. Create and/or re-design a process, component or system, and carry out specialized engineering designs.

c4. Practice the neatness and aesthetics in design and approach.

c5. Use computational facilities and techniques, measuring instruments, workshops and laboratory equipment to design experiments, collect, analyze and interpret results.

c6. Use a wide range of analytical tools, techniques, equipment, and software packages pertaining to the discipline and develop required computer programs.

c7. Apply numerical modeling methods to engineering problems.

c8. Apply safe systems at work and observe the appropriate steps to manage risks.

c9. Demonstrate basic organizational and project management skills.

c10. Apply quality assurance procedures and follow codes and standards.

c11. Exchange knowledge and skills with engineering community and industry.

c12. Prepare and present technical reports.

c13. Design and operate computer-based systems specifically designed for business applications.

c14. Use appropriate specialized computer software, computational tools and design packages throughout the phases of the life cycle of system development;

c15. Write computer programs on professional levels achieving acceptable quality measures in software development.

c16. Conducting user support activities competently.

D.   *General and Transferable Skills:*

The graduates of the computer science and engineering program should be able to:

d1. Collaborate effectively within multidisciplinary team.

d2. Work in stressful environment and within constraints.

d3. Communicate effectively.

d4. Demonstrate efficient IT capabilities.

d5. Lead and motivate individuals.

d6. Effectively manage tasks, time, and resources.

d7. Search for information and engage in life-long self learning computer science and engineering.

d8. Acquire entrepreneurial skills.

d9. Refer to relevant literatures.

3- Academic standards

(3a) External references for standards (Benchmarks)

- Leading universities
- Beneficiaries expectations
- Professional syndicates standards
- Commercial sector indicators.
- National Academic Reference Standards (NARS)
- IEEE Standards
- ABET

3b Comparison of provision to external references

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4- *Curriculum Structure and Contents*

4.a- Program duration : 5 Years

4.b- Program structure

4.b.i- No. of hours per week: Lectures 78   Lab./Exercise 69   total 147

4.b.ii- No. of hours: Compulsory 139   Elective 8   Optional -

4.b.iii-No. of hours of basic sciences courses: No. 31   % 21.1

4.b.iv- No. of hours of courses of social   No. 5   % 3.4

   sciences and humanities

4.b.v- No. of hours of specialized courses: No. 104   % 70.8

4.b.vi- No. of hours of other courses: N0. 7   % 4.7

4.b.vii   Practical/Field Training: 150

   Programming & application skills

4.b.viii-Program Levels (in credit-hours system):

5- *Program courses*

5.1- Prep. Year [Semester 1]

a. **Compulsory**

Course Code	Subject	Lecture	Exercise		Total	Program ILO's Covered (By No.)
			Tutorial	Prac		
PM 001	Mathematics (1)	4	3		7	
FR 081	Engineering drawing and projection (1)	2	4		6	
PM 003	Physics (1)	3	1	2	6	
PM 007	Special Chemistry	3	1	1	5	
CSE 061	Computer Fundamentals 1	2		2	4	a1,b1,c3,c4,d2,d3
FR 082	Specialized English Language	2			2	
		16	**9**	**5**	**30**	

5.2- Prep. Year [Semester 2]

a. Compulsory

Course Code	Subject	Weekly Hours			Total	Program ILO's Covered (By No.)
		Lecture	Exercise			
			Tutorial	Prac		
PM002	Mathematics (2)	4	2		6	
PM 005	Mechanics	3	2		5	
PM 004	Physics (2)	2	1	2	5	
FR 081	Engineering drawing and projection (2)	1	4		5	
CSE 061	Computer Fundamentals 2	1		2	3	a3,a5,b1,b2,b3c1,c2, d2,d3
FR 083	History of Engineering Sciences	2			2	
PM **006**	Production Technology (Production Engineering)	2		2	4	
		15	**9**	**6**	**30**	

5.3- 1st year [Semester 1]

a. Compulsory

Course Code	Subject	Weekly Hours			Total	Program ILO's Covered (By No.)
		Lecture	Exercise			
			Tutorial	Prac		
PM101	Mathematics (3)	4	2		6	
PM 103	Physics (3)	3	1	1	5	
AC 141	Electrical Engineering	3	2		5	
EC 121	Electronics (1)	3	2		5	
EC123	Electrical Workshop			2	2	
CSE161	Computers Operations	2	1	2	5	a1,a3,b1,b3,b6,c1,c3 ,c4,d2,d4
FR 084	Prep Training					
		15	**8**	**5**	**28**	

5.4- 1st year [Semester 2]

a. Compulsory

Course Code	Subject	Weekly Hours			Total	Program ILO's Covered (By No.)
		Lecture	Exercise			
			Tutorial	Prac		
PM 102	Mathematics (4)	4	2		6	

Course Code	Subject	Lecture	Tutorial	Prac	Total	
EC 122	Electronics (2)	3	2		5	
EC 124	Semiconductor Devices Physics and Technology	3	1	1	5	
FR 181	Envirometal Engineering	2	2		4	
EC 125	Electronic Circuits Drawing	2	3		5	
AC 142	Lab. Test	1		4	5	
		15	**10**	**5**	**30**	

5.5- 2nd year [Semester 1]

a. Compulsory

Course Code	Subject	Weekly Hours				Program ILO's Covered (By No.)
		Lecture	Exercise		Total	
			Tutorial	Prac		
PM 201	Mathematics (5)	3	2		5	
AC 242	Electrical Power amd Machines	3	2		5	
EC 221	Communication Engineering	3	2		5	
AC 241	Control Engineering	3	2		5	a1,a3,a5,b1,b2,c4,d2,d4
EC 222	Very Large Scale of Integrated Circuit (VLSI)	3	1	2	6	
EC 223	Electrical Circuits	2	2		4	
FR 182	1st year Training					
		17	**11**	**2**	**30**	

5.6- 2nd year [Semester 2]

a. Compulsory

Course Code	Subject	Weekly Hours				Program ILO's Covered (By No.)
		Lecture	Exercise		Total	
			Tutorial	Prac		
PM 202	Mathematics (6)	3	2		5	
C SE 261	Computer Engineering	3	2		5	a1,a3.a5,b1,b6,b9,c6, c9,d1,d3,d5,d9,d14
EC 234	Electronic circuit	3	2		5	
AC 243	Measurements	3	2		5	
AC 225	**Lab.** Test	2		4	6	
AC 226	Electronic work shop			2	2	
		14	**8**	**6**	**28**	

5.7- 3rd year [Semester 1]

a. Compulsory

Course Code	Subject	Weekly Hours			Total	Program ILO's Covered (By No.)
		Lecture	Exercise			
			Tutorial	Prac		
CSE 361	Computer Architecture	3	2	1	6	a1,a3,a5,b1,b3,b4,c1,d2,d3,d10
CSE 362	Database and Information systems	3	1	1	5	a1,a4,a5,b1,b2,b3,b5,c1,c2,c3,c4,d1,d2,d3,d4
CSE 363	Computer Networks	2	2		4	a1,a3,a4,a5,a6,a7,b1,b3,b4,b5,c1,c3,c5,d3,d4,d6,d7,d8,d9,d10
CSE 364	Computer Graphics and Visualization	2	1	2	5	a1,a3,a5,b1,b3,b4,c1,d2,d3,d10
CSE 366	Laboratories 1	2		3	5	a1,a3,a5,b1,b5,c1,c2,c3,c4,d2,d3,d4,d5,d6
FR 281	2nd Training					
	Total	**12**	**7**	**6**	**25**	

b- Elective- number required

Course Code	Subject	No. of units	Lecturer Hours/ week	Lab. Hours/week	Exercise. Hours/ week	Program ILOs Covered (By No.)
CSE 365	Selected Topic (1)	4	3	-	1	a1,a3,a5,b2,b3,b5,c1,c3,c4,d2,d3,d10

5.8- 3rd year [Semester 2]

a. Compulsory

Course Code	Subject	Weekly Hours			Total	Program ILO's Covered (By No.)
		Lecture	Exercise			
			Tutorial	Prac		
CSE 367	Microprocessors and their Applications	3	1	2	6	a1,a3,a5,b1,b2,b3,b,c1,c3,c4,d2,d3,d4,d6
CSE 368	Computer Operating Systems	2	2		4	a1,a4,a5,b1,b2,b3,c1,c3,c4,d2,d3,d4
CSE 369	Multimedia and virtual Reality Systems	3	1	2	6	a1,a2,a3,a5,a6,a7,b,b4,c1,c3,c4,c5,d3,d,d5,d6,d7,d8,d9,d10
CSE 370	Artificial Intelligence Technologies	2	2		4	a1,a6,b1,b3,b4,b5,c,c4,c5,d1,d2,d3,d4,d,d10
CSE 366	Lab (2)	2		3	5	a1,a3,a5,b1,b5,c1,c,c3,c4,d2,d3,d4,d5,d6
	Total	**12**	**6**	**7**	**25**	

b- Elective- number required

Course Code	Subject	No. of units	Lecturer Hours/ week	Lab. Hours/ week	Exercise Hours/ week	Program ILOs Covered (By No.)
CSE 371	Selected Topic (2)	4	3	-	1	a1,a3,b1,b3,c8,c9,d1,d2,d3

5.9- 4th year [Semester 1]

a. Compulsory

Course Code	Subject	Weekly Hours				Program ILO's Covered (By No.)
		Lecture	Exercise		Total	
			Tutorial	Prac		
CSE 461	Advanced Database and Information Systems	3	1	1	5	a1,a2,a4,a6,a7,a8,a9, b3,b4,b6,b7,b8,b9,b 10,c1,c3,c4,c6,c7,c,c 10,c11,d1,d3,d4,d7, d9,d10,d13,d14
CSE 462	Software Engineering	3	2	1	6	a1,a7,b1,b3,b4,b5,c1 ,c3,c4,c5,d1,d4,d5,d 10
CSE 463	Compiler Design	3	1	1	5	a1,a3,a5,b1,b3,b4,c1 d2,d3,d10
FR 487	Humanities	2			2	a7,a8,b8,c5,c7,c11,c 12,d4,d7,d8,d10,d15
CSE 466	Lab 3	2		3	5	c1,c2,c3,d3,d4,d6,d1 0
CSE 467	Project	2	1		3	
	Total	**15**	**5**	**6**	**26**	

b- Elective- number required

Code No.	Course Title	No. of units	Lecturer Hours/ week	Lab. Hours/ week	Exercise Hours/ week	Program ILOs Covered (By No.)
CSE 464	Selected Topic (3)	5	3	-	1	a1,a3,b3,b5,c1,c3,d2,d3, d4,d6

5.10- 4th year [Semester 2]

a. Compulsory

Course Code	Subject	Weekly Hours			Total	Program ILO's Covered (By No.)
		Lecture	Exercise			
			Tutorial	Prac		
CSE 468	Distributed Systems and Internet Technology	2	1	1	4	a1,a2,a3,a4,a5,b1,b2,c1,c2,d1,d2,d3
CSE 469	Advanced Computer Network	3	2		5	a1,a3,a4,a5,a6,a7,b1,b3,b5,c1,c3,c5,d3,d4,d6,d7,d8,d9,d10
CSE 470	Computer Vision and Image Analysis	2	1	1	4	a1,a2,a5,b2,b3,b4,c1,c3,c4,d2,d4,d9,d10
CSE 471	Parallel systems and its Applications	2	2		4	a1,a3,a7,b1,b2,b3,b4,c1,c3,d1,d2,d3,d10
CSE 466	Laboratories 4	1		3	4	c1,c2,c3,d3,d4,d6,d7,d8,d9,d10
CSE 467	Project	2	2		4	
	Total	**12**	**8**	**5**	**25**	

b- Elective- number required

Code No.	Course Title	No. of units	Lecturer Hours/week	Lab. Hours/week	Exercise Hours/week	Program ILOs Covered (By No.)
CSE 472	Selected Topic (4)	4	3	-	1	a1,b1,b2,b3,c3,c4,d2,d3

6- Program admission requirements

General Secondary School Certificate with Major in Mathematics with high academic reference, at secondary school marks of > 91%, or an equivalent certificate from a foreign institute recognized by the university. The program is studied for a minimum of four years full-time.

The program is arranged normally in 2 semesters per year each semester 10 x 14 week. There are normally 28 (2 x 14) study weeks (excluding examination periods and summer session) in each year. The program is divided into 147 hours per week: 31 basic science hours per week, 104 specialized hours per week, 5 sciences and humanities hours per week, and 7 other hours per week. Currently there are no Optional courses on this program.

7- Regulations for progression and program completion

(For the students to be transferred from one academic year to the next, he/she is required to have successfully passed in all subjects. However, the student may still be transferred if he/she has failed in not more than two basic subjects from the same academic year or from previous years. In such cases, students " carrying" subjects from one year to the next should re-sit for their "failed" subjects in their proper respective semesters.

Final year students who have failed in a maximum of two basic complementary ones in that year or from previous years can re-sit for their exams in those subjects in September of the same year. Should the student failed again, he/she has to re-sit for his/her exams in those subjects in their proper respective semesters thereafter as many times as necessary until he/she succeeds).

Marks from the first year to the fourth year are weighted so that determination of overall marks of the degree. The final overall marks determine the degree classification as follows:

• Less than 50%   Fail
• At least 50% and less than 65%   Pass
• At least 65 and less than 75 %   Good
• At least 75 and less than 85 %   Very good
• At least 85 and more   Excellent

Prep. Year/Level/Semester

- Moved to first year, Passing in all courses of the year or fail in not more than two compulsive subjects

First Year/Level/Semester

- Moved to second year, Passing in all courses of the year or fail in not more than two compulsive subjects

Second Year Semester 1, and 2

- Passing in all courses the year but at least two related to first and second years

Third Year Semester 1, and 2

- Passing in all courses the year but at least two related to first, second, and/or

  third years.

Forth Year Semester 1, and 2

Passing in all courses or fail in not more than two compulsive subjects. In this case, the student is allowed to enter a September Exam in the same year.

By laws and Regulations for Undergraduate Students "Enrollment opportunities/or "regular" and "external" students:

Academic year	Enrollment opportunities	
	Regular students	External students
Prep.	Two opportunities	None
First	Two opportunities	Two opportunities
Second	Two opportunities	Two opportunities
Third	Two opportunities	Two opportunities
Fourth	Two opportunities	Number of subjects, he/she would Be allowed to re-sit for the exam the subjects he/she has failed in indefinitely until He/she is graduated.

Once the student exhausts the number of opportunities of a being a regular" student, he/she becomes an "external" student for a certain number of times according to the above table. Once an "external" student in a certain year succeeds in his/her exams for that year to allow him/her to be transferred to the following year, he/she automatically becomes registered as a regular student again.

8- Evaluation of program intended learning outcomes

Evaluator	Tool	Sample
1- Senior students		
2- Alumni		
3- Stakeholders (Employers)		
4-External Evaluator(s) (External Examiner(s))		
5- Other		

Annex 1

Attach course specifications