LAMPIRAN II(A)
PROGRAM SPECIFICATION

Faculty of Computer Science and Information Systems
UNIVERSITI TEKNOLOGI MALAYSIA

1. Awarding Institution	Universiti Teknologi Malaysia
2. Teaching Institution	Universiti Teknologi Malaysia
3. Programme Name	Bachelor in Computer Science
4. Final Award	Bachelor of Computer Science (Industrial Computing)
5. Programme Code	TC28(SCS)
6. Professional or Statutory Body of Accreditation	-
7. Language(s) of Instruction	Bahasa Melayu and English
8. Mode of Study (Conventional, distance learning, etc)	Conventional
9. Mode of operation (Franchise, self-govern, etc)	Self-govern
10. Study Scheme (Full Time/Part Time)	Full Time
11. Study Duration	Minimum : 3 ½ yrs Maximum : 5 ½ yrs

Type of Semester	No. of Semesters		No. of weeks	
	Full Time	Part Time	Full Time	Part Time
Long	7		14	
Short				

12. Entry Requirement	**Matriculation** *Science Stream:* Passed with at least Grade C (2.00) in Mathematics **AND** passed with at least grade C (2.00) in ONE (1) of these subjects: Physics, Chemistry, Biology, Computer Science **STPM** with minimum of C in Advanced Mathematics or Computing and one of the following subjects: Chemistry, Physics or Biology. **Diploma** in computer Science form UTM or equivalent with at least PNGK: 2.50 **OR** Candidates with PNGK< 2.50, with at least 2 years working experience in related area.

13. Programme Objectives

(i) To produce graduates who are able to solve real problem using technique and principle of computer science.

(ii) To produce graduates who are able to design, test, maintain, and develop industrial system software.

(iii) To produce graduates who are able to model and analyze industrial problem using quantitative technique and To produce graduates who are able to assist industrial operational manager in making decision through intuitive way.

(iv) To produce graduates who are able assist manufacturing sector to realize the computer integrated manufacturing concept and production automation.

(v) To produce graduates who are able to demonstrate leadership, entrepreneurship and communicate effectively across range of context and audiences.

(vi) To produce graduates who are able to independently conduct lifelong learning and adapt readily to changing situations.

(vii) To produce graduates who are able to demonstrate behaviors that are consistent with professional ethics and responsibilities.

LAMPIRAN II(A)
PROGRAM SPECIFICATION

Faculty of Computer Science and Information Systems
UNIVERSITI TEKNOLOGI MALAYSIA

14. Programme Learning Outcomes

Intended Learning Outcomes	Teaching and Learning Methods	Assessment
(a)Technical Knowledge and Competencies		
LO1: Ability to solve real problem using technique and principle of computer science.		
Ability to demonstrate knowledge, understanding and application of appropriate computer science principle and technique to solve industrial problem.	Lectures, tutorials, laboratory works, problem-based learning	Examinations, laboratory works, discussions, problem-based exercises, group projects, independent projects.
LO2: Ability to design, test, maintain, and develop software of industrial operation system.		
Ability to model and design computer-based systems of industrial problem.	Project supervision, lectures, seminars, laboratory works, directed reading, simulation exercises, independent research	Project reports, seminar presentations, design project, individual research project.
LO3: Ability to model and analyze industrial problem using quantitative technique.		
Ability to use standard quantitative technique to model and analyze industrial problem.	Lectures, tutorials, independent research, seminars, directed-reading	Examinations, seminar presentations, discussions, problem-based exercises, group projects, independent projects
LO4: Ability to assist industrial operational manager in making decision through intuitive way.		
Ability to provide optimize solution through intuitive way for the operational manager to manage and monitor industrial process effectively.	Project supervision, lectures, invited speakers, seminars, laboratory works, directed reading, independent research, problem-based learning.	Problem-based examinations, laboratory reports, seminar presentations, design project, seminar report, individual research project.
LO5: Ability to identify and create business opportunities.		
Ability to identify and create business opportunities in information and communication technology applications	Project supervision, lectures, invited speakers, industrial visit, seminars, directed reading, brainstorming	Examinations, seminar presentations, seminar report, group project
(b) Generic Skills		
Intended Learning Outcomes	Teaching and Learning Methods	Assessment
LO6: Team Working		
Ability to work effectively in a team	Group projects presentation	Oral presentations, peer evaluation
LO7: Adaptability		
Ability to undertake lifelong learning and actively participate in change (Adaptability)	Tutorials, laboratory works, group project assignments, independent reading	Group reports, learning logs/diaries (learning portfolios), seminar presentation,
LO8: Communication Skills		
Ability to present technical solutions to a range of audience (Communication Skills)	Individual presentation, Independent research projects, group research projects, industrial training	Oral presentation, peer evaluation, supervisor evaluation
LO9: Ethics		
Ability to demonstrate behaviours that are consistent with the Code of Professional Ethics and Reponsibilities	Independent research projects, group research projects, industrial training	Industrial training report, independent project report, peer evaluation, learning portfolios

15. Classification of Subjects			
No.	Classification	Credit Hours	Percentage
i.	University a. General b. Language c. Co-curriculum	 8 6 2	 14.3
ii.	Faculty Core	66	58.9
iii.	Programme Core	24	21.4
iv.	Programme Electives	6	5.4
	Total	112	100
For engineering programme please fill up the following classification. (Others please refer to the Statutory Body guidelines)			
A	Engineering Subjects (a) Lecture (b) Laboratory/Workshop (c) Industrial Training (d) Final Year Project		
	Total credit hours for Part A		
B	Related Subjects (a) Applied Science/Maths/Computer (b) Management/Law/Humanities/Ethics (c) Co-Curriculum (d) Others		
	Total credit hours for Part B		
iii.	Total Credit Hours for Part A and B		

16. Total credit hours to graduate	112 credit hours

LAMPIRAN II(A)
PROGRAM SPECIFICATION

Faculty of Computer Science and Information Systems
UNIVERSITI TEKNOLOGI MALAYSIA

17. Programme structures and features, curriculum and award requirements

The course is offered in full-time mode and based on a 2 Semester Academic Year with several subjects being delivered and assessed in each Semester. Assessment : 25-50% examination, 50-75% coursework

Award requirements:
Students should:

- Achieve a total of 112 credit hours with minimum CPA of 2.0.
- Pass industrial training (equivalent to 12 credit hours).
- Complete the undergraduate project at Year 3.

SEMESTER I		
SCJ1013	Programming Technique 1	3
SCR1013	Logic Digital	3
SCD1513	Technology & Information System	3
SCI1113	Computational Mathematic	3
UHS1152	Ethnic Relations	2
UHB1412	English for Academic Communications	2
	TOTAL CREDIT	**16**

SEMESTER II		
SCJ1023	Programming Technique 2	3
SCD1523	Database	3
SCR1043	Computer Organization & Architecture	3
SCJ1203	Software Engineering	3
SCV1023	Human Computer Interaction	3
ULT1022	Islamic Civilization and Asia Civilization (TITAS)	2
UQRxxx1	Co-Curriculum	1
	TOTAL CREDIT	**18**

SEMESTER III		
SCR2213	Network Communication	3
SCI2113	Modeling & Simulation	3
SCJ2013	Data Structure & Algorithm	3
SCD2613	System Analysis and Design	3
SCJ2153	Object Oriented Programming	3
ULT2132	Islam & Current Issues	2
	TOTAL CREDIT	**17**

SEMESTER IV		
SCJ2103	Application Development	3
SCR3043	Operating System	3
SCI2123	Industrial Operations Management	3
SCI2133	Statistical Data Analysis	3
UHB2422	Advanced English for Academic Communications	2
UHS2xx2	Elektif UHS	2
UQRxxx1	Co-Curriculum	1
	TOTAL CREDIT	**17**

SEMESTER V		
SCJ3203	Computer Science Theory	3
SCI3113	Industrial Automation System	3
SCI3123	Industrial Management Science	3
SCI3133	Inventory Control and Material Requirement Planning	3
SCI3032	Project 1	2
UHB3xx2	Elective English	2
	TOTAL CREDIT	**16**

SEMESTER VI		
SCK3118	Practical Training	8
SCK3114	Practical Training Report	4
	TOTAL CREDIT	**12**

SEMESTER VII		
SCI3143	Numerical Data Computation	3
SXXxxx3	Elective Subject I	3
SXXxxx3	Elective Subject II	3
SCI4134	Project 2	4
SCD4763	Information Technology Entrepreneurship	3
	TOTAL CREDIT	**16**

18. Mapping of Programme Learning Outcomes to Subjects

		LO1	L02	L03	L04	L05	L06	L07	L08	L09
SCJ1013	Programming Technique 1	a	b				1	2	1	1
SCR1013	Logic Digital	b	c		c		1	1		
SCD1513	Technology & Information System	b	c		b		2	2	2	1
SCI1113	Computational Mathematic	c		a	c		2	2		
SCJ1023	Programming Technique 2	a	a				1	2	1	1
SCD1523	Database	a	a				2	2	2	
SCR1043	Computer Organization & Architecture	c			b		1	1		
SCJ1203	Software Engineering	b	a		c		1	1	1	1
SCV1023	Human Computer Interaction	b	b				2		2	
SCR2213	Network Communication	c	b		c		2	2		
SCI2113	Modeling & Simulation	b	c	a	a		1	2	2	
SCJ2013	Data Structure & Algorithm	a	a				1	1	1	2
SCD2613	System Analysis and Design	a	a	b	b		2	2	2	
SCJ2153	Object Oriented Programming	a	a				1	2	1	1
SCJ2103	Application Development	b	a			a	1	1	1	2
SCR3043	Operating System	a	b						2	
SCJ3203	Computer Science Theory	a	b	b	b		1	1	1	2
SCD4763	Information Technology Entrepreneurship	b		a	a	a	1	2	1	2
SCI3032	Project I	b		a	b	a		2	1	1
SCI4134	Project II	a	a	b	a	a		2	1	1

Key:
Technical Skills: a = major contribution to outcome; b = moderate contribution to outcome; c = minor contribution to outcome
Generic Skills: 1 = Substantial (with assessment); 2 = not substantial (introduce)

LAMPIRAN II(A)
PROGRAM SPECIFICATION

Faculty of Computer Science and Information Systems
UNIVERSITI TEKNOLOGI MALAYSIA

	LO1	L02	L03	L04	L05	L06	L07	L08	L09
Programme Core									
SCI2123 Industrial Operations Management	a		c	a		1	2		2
SCI2133 Statistical Data Analysis	b	c	a	a		2	2		
SCI3113 Industrial Automation System	b	a	a	b	b	1	2	2	2
SCI3123 Industrial Management Science	a		b	a		1	2	2	
SCI3133 Inventory Control and Material Requirement Planning	b	b	a	a		1	2	2	
SCI3143 Numerical Data Computation	c		a	a		2	2		
Programme Electives									
SCI4113 Computer Aided Design and Manufacturing	b	a		a	b	1	2	2	2
SCI4123 Robotic and Industrial Logic Control	b	a	a	a		1	2	2	
SCI4133 Reliability and Maintenance	b	b	a	a		2	2		
SCI 4143 Quality Control Techniques	b		b	a		1	2	2	2
SCI 4153 Industrial Quality Management	b		b	a	b	1	2	2	2
SCI 4213 Supply Chain Management	b	b	a	a		1	2	2	
SCI 4223 Production Process Scheduling	b	c	b	a		2	2		
SCI 4233 Graph Theory Application in Industry	c	c	b	a	b	2	2		
SCI 4243 Forecasting Method in Industry	c		a	a		2	2		
SCI 4253 Stochastic Model in In Industry	c		a	b		2	2		
SCI 4313 Special Topic in Industrial Computing	a	b		a			2	2	

Key:
Technical Skills: a = major contribution to outcome; b = moderate contribution to outcome; c = minor contribution to outcome
Generic Skills: 1 = Substantial (with assessment); 2 = not substantial (introduce)

19. Career Prospects

Graduate of the programme can work as:

i. Computer Programmer, Software Engineer or System Analyst in a software house that develop a new software or custom-made software used in industrial and service sector such as Supply Chain Management software, Enterprise Resource Planning software, Warehouse Management Software, Robot Simulation Software, Project Management software, quality control software, Scheduling software, Maintenance software, and CAD/CAM software.
ii. Quality Assurance executive, Operation Analyst or IT executive in a factory that implement an automation philosophy in the production or manufacturing process.
iii. System Integrator in industrial automation company that design and develop an automation system that deals with sensors, PLC, robotics, conveyers, CNC machine and ASRS.
iv. IT executive or Researcher that deals with statistical data analysis software to assist operation manager in analyzing data.

20. Cross Campus Programme

Students are given an opportunity to enroll few courses in participating universities and the grades and credits (up to 1/3 of the total credits of the curriculum) can be transferred. At the moment, there are four participating universities i.e. Universiti Teknologi Malaysia, Universiti Sains Malaysia, Universiti Malaya and Universiti Malaysia Sarawak.

21. UTM Degree ++ Programme

Students are given a chance to enroll in certificate programmes offered by Centres of Excellence in the university during their semester breaks. For example, data analysis software, PLC programming, CAD/CAM software, Robotic programming, ERP software, WMS software, and Robot Simulation software, Simulation software and engineering tools such as Matlab.

22. Facilities available

List of laboratories:

1. Three General Programming Laboratories with the capacity of 60 computers on each laboratory.
2. Seven Teaching Laboratories with capacity of 60 computers on each laboratory.
3. Modeling & Simulation Laboratory with the capacity of 30 computers.
4. Computer Aided Design and Manufacturing Laboratory.
5. Computer Integrated Manufacturing Laboratory.
6. Operational Research Laboratory.
7. Industrial Computing Teaching Laboratory with the capacity of 30 computers.