

## City University of Hong Kong

## Curriculum Information Record for a Major/Degree

Department of Computer Science

Effective from Semester A 2023/2024

For Students Admitted/Changed to the Major with Catalogue Term

Semester A 2023/24 and thereafter

*(Subject to approval)***Part I Major/Degree Overview****Major** (in English) : Computer Science

(in Chinese) : 電腦科學

**Degree** *(For students admitted to the University in 2015/16 and thereafter)*

(in English) : Bachelor of Science

(in Chinese) : 理學士

*(For students admitted to the University in 2014/15 and before)*

(in English) : Bachelor of Science (Honours)

(in Chinese) : 榮譽理學士

**Award Title<sup>#</sup>** *(For students admitted to the University in 2015/16 and thereafter)*

(in English) : Bachelor of Science in Computer Science

(in Chinese) : 理學士 (電腦科學)

*(For students admitted to the University in 2014/15 and before)*

(in English) : Bachelor of Science (Honours) in Computer Science

(in Chinese) : 電腦科學榮譽理學士

*# Please make reference to the "Guidelines on Award Titles" approved by the Senate when proposing new award titles or changes to existing award titles (Senate/86/A5R).*

**1. Normal and Maximum Period of Study**

	<b>Normative 4-year Degree</b>	<b>Advanced Standing I (Note 1)</b>	<b>Advanced Standing II (Senior-year Entry) (Note 2)</b>
Normal period of study	4 years	3 years	2 years
Maximum period of study	8 years	6 years	5 years

**2. Minimum Number of Credit Units Required for the Award and Maximum Number of Credit Units Permitted**

<b>Degree Requirements</b>	<b>Normative 4-year Degree</b>	<b>Advanced Standing I</b>	<b>Advanced Standing II (Senior-year Entry)</b>
Gateway Education requirement *	30 credit units	21 credit units	12 credit units
College/School requirement *	6 credit units	waived	waived
Major requirement	84 credit units (Core: <del>69</del> <u>66</u> Elective: <del>15</del> <u>18</u> )	75 credit units (Core: <del>63</del> <u>60</u> Elective: <del>12</del> <u>15</u> )	60 credit units (Core: <del>48</del> <u>45</u> Elective: <del>12</del> <u>15</u> )
Free electives / Minor (if applicable)	0 credit unit	0 credit unit	0 credit unit
<b>Minimum number of credit units required for the award</b>	<b>120 credit units</b>	<b>96 credit units</b>	<b>72 credit units</b>

<b>Maximum number of credit units permitted</b>	<b>144 credit units</b>	<b>114 credit units</b>	<b>84 credit units</b>
---	-------------------------	-------------------------	------------------------

*\* For details, please refer to the Curriculum Information Record for Common Requirements.*

**3. Aims of Major**

This major aims to provide the best possible undergraduate education with a well-balanced emphasis on computer science theories, practical hands-on development skills as well as software engineering management know-how needed to manage or work as a member of a software development team.

Through in-depth lectures and rigorous tutorials, laboratory work, projects and case studies, students will acquire a broad and thorough understanding of the theories and practical skills behind software design and development, software engineering, database systems, computer networks and information security. In addition, our study streams allow students to further specialize in different areas of expertise. The B.Sc. Computer Science includes a year long day-release industrial placement component that allows students to gain valuable real world work experience. Graduates can leverage this strong foundation to pursue technical as well as managerial positions in their career.

#### 4. Intended Learning Outcomes of Major (MILOs)

(Please state what the student is expected to be able to do on completion of the major according to a given standard of performance.)

Upon successful completion of this major, students should be able to:

No.	MILOs	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
		A1	A2	A3
1.	Apply relevant mathematics and engineering methods to computing.			
2.	Use computer programming for problem solving.			
3.	Identify problems, analyze requirements and formulate design to meet realistic constraints, such as costs, operational, social, cultural, ethical, environmental, health and safety.			
4.	Use software engineering methods and tools for developing and implementing quality software solutions.			
5.	Communicate and use language effectively.			
6.	Manage projects effectively and independently.			
7.	Apply specialized knowledge in selected area(s) of Computer Science.			
8.	Reflect on the ethical, legal, security and social responsibilities required of professional citizens in a global society.			
9.	Stay abreast of contemporary issues in computing and recognize the need for, and able to engage in life-long learning.			
10.	Collaborate and function effectively in team work situations including multi-disciplinary team.			
11.	Function effectively in an industrial environment and apply learned skills to real-world problems.			
12.	Acquire inquisitive attitude and skill to enable creating an original discovery or design related to computing.	✓	✓	✓

A1: Attitude

*Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.*

A2: Ability

*Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.*

A3: Accomplishments

*Demonstrate accomplishments of discovery/innovation/creativity through producing/constructing creative works/new artefacts, effective solutions to real-life problems or new processes.*

## Part II Major Requirement

(The catalogue term of the major requirement that students will follow will be the effective term of the declared/allocated major.)

For normative 4-year degree students who will join the majors allocation exercise, the catalogue term of major requirement will be one year after admission.

For advanced standing students and 4-year degree students who already have a major at the time of admission, the catalogue term of major requirement will be the same as their admission term.)

### For Normative 4-year Degree (84 credit units)

#### 1. Core Courses (6966 credit units)

##### Required CS Courses – 5855 credit units

Course Code	Course Title	Level	Credit Units	Remarks
CS2115	Computer Organization	B2	3	
CS2204	Fundamentals of Internet Applications Development	B2	3	
CS2310	Computer Programming	B2	3	
CS2312	Problem Solving and Programming	B2	3	
CS2402	Introduction to Computational Probability Modelling	B2	3	
CS2611	Seminars on Contemporary Technology I	B2	1	
CS3103	Operating Systems	B3	3	
CS3201	Computer Networks	B3	3	
CS3334	Data Structures	B3	3	
CS3342	Software Design	B3	3	
CS3343	Software Engineering Practice	B3	3	
CS3402	Database Systems	B3	3	
<del>CS3504</del> <del>CS3505</del>	<del>IT Professional Placement</del> <del>IT Professional Internship</del> <i>(subject to approval)</i>	B3	<del>12</del> <u>9</u>	A course to fulfil the internship/consultancy project/research project requirement for normative 4-year degree students
CS4335	Design and Analysis of Algorithms	B4	3	
CS4514	Project	B4	9	A course to fulfil the internship/consultancy project/research project requirement for normative 4-year degree students

##### Required Supporting Courses – 11 credit units

MA2185	Discrete Mathematics	B2	3	
EN4262	English Communication Skills for Computing	B4	2	
Choose any ONE from the following list:				
GE2313	Global IT Case Studies	B2	3	
GE2324	The Art and Science of Data	B2	3	
GE2338	Internet Applications and Security	B2	3	
GE2340	Artificial Intelligence – Past, Present, and Future	B2	3	
Choose any ONE from the following list:				
CB2100	Introduction to Financial Accounting	B2	3	

CB2300	Management	B2	3	
CB2500	Information Management	B2	3	
CB2601	Marketing	B2	3	

2. Electives (**1518** credit units) (*subject to approval*)

*Electives : minimum 1518 credit units from these electives*  
 Students may choose any of the streams by taking **3** courses of the selected stream and any **23** elective courses from the list. For those who do not want to focus on a selected stream, they can take any **56** elective courses from the list.

Course Code	Course Title	Level	Credit Units	Remarks
<b>Artificial Intelligence Stream : Stream Core</b>				
CS4486	Artificial Intelligence	B4	3	
CS4487*	Machine Learning	B4	3	*Same course
<i>Choose <u>one</u> out of the following two courses:</i>				
CS4186#	Computer Vision and Image Processing	B4	3	#Same course
CS4386	AI Game Programming	B4	3	
<b>Data Science Stream: Stream Core</b>				
CS3481	Fundamentals of Data Science	B3	3	
CS4480	Data-Intensive Computing	B4	3	
CS4487*	Machine Learning	B4	3	*Same course
<b>Information Security Stream : Stream Core</b>				
CS4286	Internet Security and E-Commerce Protocols	B4	3	
CS4293	Topics in Cybersecurity	B4	3	
CS4394	Information Security and Management	B4	3	
<b>Multimedia Computing Stream : Stream Core</b>				
CS3483	Multimodal Interface Design	B3	3	
CS4182	Computer Graphics	B4	3	
<i>Choose <u>one</u> out of the following four courses:</i>				
CS4185	Multimedia Technologies and Applications	B4	3	
CS4186#	Computer Vision and Image Processing	B4	3	#Same course
CS4187	Computer Vision for Interactivity	B4	3	
CS4188	Virtual Reality	B4	3	
<b>Software Engineering and Project Management Stream : Stream Core</b>				
<i>Choose <u>three</u> out of the following four courses:</i>				
CS3346	Software Testing and Maintenance	B3	3	
CS3356	Managing Software Projects	B3	3	Exclusive with IS4500
CS4348	Software Quality Management	B4	3	
CS4389	Decentralized Applications Development	B4	3	
<b>Other Electives :</b>				
CS3185	Computer Architecture	B3	3	
CS3283	Distributed Systems	B3	3	
CS3382	Web Usability Design and Engineering	B3	3	
CS3391	Advanced Programming	B3	3	

Course Code	Course Title	Level	Credit Units	Remarks
CS4280	Advanced Internet Applications Development	B4	3	
CS4284	Mobile Computing	B4	3	
CS4285	High Speed Multimedia Networks	B4	3	
CS4288	Cryptographic Algorithms and Protocols	B4	3	
CS4289	Pervasive Computing	B4	3	
CS4295	Mobile Application Programming	B4	3	
CS4296	Cloud Computing	B4	3	
CS4297	Cloud Robotics and Automation	B4	3	
CS4298	iOS Application Development	B4	3	
CS4367	Computer Games Design	B4	3	
CS4381	Advanced Software Design	B4	3	
CS4385	Topics in Software Engineering	B4	3	
CS4482	Advanced Database Systems	B4	3	
CS4485	Information Retrieval	B4	3	
CS4552	Guided Study	B4	3	A course to fulfil the internship/consultancy project/research project requirement for normative 4-year degree students
MA2172	Applied Statistics for Sciences and Engineering	B2	3	

### For Advanced Standing I (75 credit units)

#### 1. Core Courses (~~6360~~ credit units)

##### Required CS Courses – ~~5855~~ credit units

Course Code	Course Title	Level	Credit Units	Remarks
CS2115	Computer Organization	B2	3	
CS2204	Fundamentals of Internet Applications Development	B2	3	
CS2310	Computer Programming	B2	3	
CS2312	Problem Solving and Programming	B2	3	
CS2611	Seminars on Contemporary Technology I	B2	1	
JC2066	IT Professionals: Ethical, Legal and Social Issues	B2	3	
CS3103	Operating Systems	B3	3	
CS3201	Computer Networks	B3	3	
CS3334	Data Structures	B3	3	
CS3342	Software Design	B3	3	
CS3343	Software Engineering Practice	B3	3	
CS3402	Database Systems	B3	3	
<del>CS3504</del>	<del>IT Professional Placement</del>	B3	<del>12</del>	
<del>CS3505</del>	<del>IT Professional Internship</del> <i>(subject to approval)</i>		<del>9</del>	
CS4335	Design and Analysis of Algorithms	B4	3	
CS4514	Project	B4	9	

##### Required Supporting Courses – 5 credit units

MA2185	Discrete Mathematics	B2	3	
EN4262	English Communication Skills for Computing	B4	2	

2. Electives (**1215 credit units**) (*subject to approval*)

*Electives : minimum **1215** credit units from these electives*

Students may choose any of the streams by taking **3** courses of the selected stream. For those who do not want to focus on a selected stream, they can take any **45** elective courses from the list.

Course Code	Course Title	Level	Credit Units	Remarks
<b>Artificial Intelligence Stream : Stream Core</b>				
CS4486	Artificial Intelligence	B4	3	
CS4487*	Machine Learning	B4	3	*Same course
<i>Choose <u>one</u> out of the following two courses:</i>				
CS4186#	Computer Vision and Image Processing	B4	3	#Same course
CS4386	AI Game Programming	B4	3	
<b>Data Science Stream: Stream Core</b>				
CS3481	Fundamentals of Data Science	B3	3	
CS4480	Data-Intensive Computing	B4	3	
CS4487*	Machine Learning	B4	3	*Same course
<b>Information Security Stream : Stream Core</b>				
CS4286	Internet Security and E-Commerce Protocols	B4	3	
CS4293	Topics in Cybersecurity	B4	3	
CS4394	Information Security and Management	B4	3	
<b>Multimedia Computing Stream : Stream Core</b>				
CS3483	Multimodal Interface Design	B3	3	
CS4182	Computer Graphics	B4	3	
<i>Choose <u>one</u> out of the following four courses:</i>				
CS4185	Multimedia Technologies and Applications	B4	3	
CS4186#	Computer Vision and Image Processing	B4	3	#Same course
CS4187	Computer Vision for Interactivity	B4	3	
CS4188	Virtual Reality	B4	3	
<b>Software Engineering and Project Management Stream : Stream Core</b>				
<i>Choose <u>three</u> out of the following four courses:</i>				
CS3346	Software Testing and Maintenance	B3	3	
CS3356	Managing Software Projects	B3	3	Exclusive with IS4500
CS4348	Software Quality Management	B4	3	
CS4389	Decentralized Applications Development	B4	3	
<b>Other Electives :</b>				
CS3185	Computer Architecture	B3	3	
CS3283	Distributed Systems	B3	3	
CS3382	Web Usability Design and Engineering	B3	3	
CS3391	Advanced Programming	B3	3	
CS4280	Advanced Internet Applications Development	B4	3	
CS4284	Mobile Computing	B4	3	
CS4285	High Speed Multimedia Networks	B4	3	

CS4288	Cryptographic Algorithms and Protocols	B4	3	
CS4289	Pervasive Computing	B4	3	
Course Code	Course Title	Level	Credit Units	Remarks
CS4295	Mobile Application Programming	B4	3	
CS4296	Cloud Computing	B4	3	
CS4297	Cloud Robotics and Automation	B4	3	
CS4298	iOS Application Development	B4	3	
CS4367	Computer Games Design	B4	3	
CS4381	Advanced Software Design	B4	3	
CS4385	Topics in Software Engineering	B4	3	
CS4482	Advanced Database Systems	B4	3	
CS4485	Information Retrieval	B4	3	
CS4552	Guided Study	B4	3	
MA2172	Applied Statistics for Sciences and Engineering	B2	3	

### For Advanced Standing II (60 credit units)

#### 1. Core Courses (4845 credit units)

15 credit units are waived for students admitted into Advanced Standing II including courses CS2115, CS2204, CS2310, CS3201, JC2066

#### Required CS Courses – 4340 credit units

Course Code	Course Title	Level	Credit Units	Remarks
CS2312	Problem Solving and Programming	B2	3	
CS2611	Seminars on Contemporary Technology I	B2	1	
CS3103	Operating Systems	B3	3	
CS3334	Data Structures	B3	3	
CS3342	Software Design	B3	3	
CS3343	Software Engineering Practice	B3	3	
CS3402	Database Systems	B3	3	
<del>CS3504</del>	<del>IT Professional Placement</del>	B3	<del>12</del>	
<del>CS3505</del>	<del>IT Professional Internship</del> <i>(subject to approval)</i>		<del>9</del>	
CS4335	Design and Analysis of Algorithms	B4	3	
CS4514	Project	B4	9	

#### Required Supporting Courses – 5 credit units

MA2185	Discrete Mathematics	B2	3	
EN4262	English Communication Skills for Computing	B4	2	



2. Electives (**1215 credit units**) (*subject to approval*)

*minimum 1215 credit units from these electives*  
 Students may choose any of the streams by taking **3** courses of the selected stream. For those who do not want to focus on a selected stream, they can take any **45** elective courses from the list.

Course Code	Course Title	Level	Credit Units	Remarks
<b>Artificial Intelligence Stream : Stream Core</b>				
CS4486	Artificial Intelligence	B4	3	
CS4487*	Machine Learning	B4	3	*Same course
<i>Choose <u>one</u> out of the following two courses:</i>				
CS4186#	Computer Vision and Image Processing	B4	3	#Same course
CS4386	AI Game Programming	B4	3	
<b>Data Science Stream: Stream Core</b>				
CS3481	Fundamentals of Data Science	B3	3	
CS4480	Data-Intensive Computing	B4	3	
CS4487*	Machine Learning	B4	3	*Same course
<b>Information Security Stream : Stream Core</b>				
CS4286	Internet Security and E-Commerce Protocols	B4	3	
CS4293	Topics in Cybersecurity	B4	3	
CS4394	Information Security and Management	B4	3	
<b>Multimedia Computing Stream : Stream Core</b>				
CS3483	Multimodal Interface Design	B3	3	
CS4182	Computer Graphics	B4	3	
<i>Choose <u>one</u> out of the following four courses:</i>				
CS4185	Multimedia Technologies and Applications	B4	3	
CS4186#	Computer Vision and Image Processing	B4	3	#Same course
CS4187	Computer Vision for Interactivity	B4	3	
CS4188	Virtual Reality	B4	3	
<b>Software Engineering and Project Management Stream : Stream Core</b>				
<i>Choose <u>three</u> out of the following four courses:</i>				
CS3346	Software Testing and Maintenance	B3	3	
CS3356	Managing Software Projects	B3	3	Exclusive with IS4500
CS4348	Software Quality Management	B4	3	
CS4389	Decentralized Applications Development	B4	3	
<b>Other Electives :</b>				
CS3185	Computer Architecture	B3	3	
CS3283	Distributed Systems	B3	3	
CS3382	Web Usability Design and Engineering	B3	3	
CS3391	Advanced Programming	B3	3	
CS4280	Advanced Internet Applications Development	B4	3	
CS4284	Mobile Computing	B4	3	
CS4285	High Speed Multimedia Networks	B4	3	
CS4288	Cryptographic Algorithms and Protocols	B4	3	
CS4289	Pervasive Computing	B4	3	

Course Code	Course Title	Level	Credit Units	Remarks
CS4295	Mobile Application Programming	B4	3	
CS4296	Cloud Computing	B4	3	
CS4297	Cloud Robotics and Automation	B4	3	
CS4298	iOS Application Development	B4	3	
CS4367	Computer Games Design	B4	3	
CS4381	Advanced Software Design	B4	3	
CS4385	Topics in Software Engineering	B4	3	
CS4482	Advanced Database Systems	B4	3	
CS4485	Information Retrieval	B4	3	
CS4552	Guided Study	B4	3	
MA2172	Applied Statistics for Sciences and Engineering	B2	3	

### Part III Admission Requirements for Entry to the Major, if any

*(Admission requirements here refers to specific requirements for students already admitted to the College/School/Department with an undeclared major. Academic units can state the prerequisites required for admission to the major.)*

To be eligible for admission, you must satisfy the General Entrance Requirements.

#### Alternative Entry

- Alternatively, you will be considered as meeting the programme entrance requirements if you hold a higher diploma or an associate degree in computing related discipline, or an equivalent qualification.

### Part IV Accreditation by Professional / Statutory Bodies

The programme is the first computer science programme in Hong Kong accredited by the Hong Kong Institution of Engineers (HKIE). Based on the Seoul Accord, graduates will receive reciprocal recognition from the equivalent bodies in Australia, Canada, Israel, New Zealand, South Africa, the UK and the US.

### Part V Additional Information

Nil

## Part VI Curriculum Map

(The curriculum map shows the mapping between courses and the MILOs. It should cover all courses designed specifically for the major.)

			MILOs														
			M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12			
City University Ideal Graduate Outcomes			GO2	GO2	G02 GO5	GO2	GO3	GO1	GO1	GO1 GO5	GO4	GO3	GO1	GO2 GO4			
Discovery-enriched Curriculum (DEC) elements*					✓									✓			
Graduate Attributes (Professional bodies) (Optional) (Professional Body: The Hong Kong Institution of Engineers)			GA1 (a)	GA10 (j)	GA3 (c) GA4 (d)	GA10 (j)	GA7 (g)	GA4 (d)	GA1 (a) GA2 (b)	GA6 (f) GA8 (h)	GA9 (i)	GA5 (e)		GA9 (i)			
Course <sup>1</sup>			MILOs Consists of 3 elements - Teach (T), Practise (P), Measure (M)												DEC M12		
Code	Title	Credit	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11		A1	A2	A3
<b>Gateway Education Requirement</b>																	
GE1401	University English	3					T, P										
GE2410	English for Engineering	3					T, P										
GE1501	Chinese Civilisation - History and Philosophy	3								T, P							
<b>College-Specified Courses (9 credit units)</b>																	
MA1200	Calculus and Basic Linear Algebra I	3	T, P														
MA1300	Enhanced Calculus and Linear Algebra I	3	T, P														
MA1201	Calculus and Basic Linear Algebra II	3	T, P														
MA1301	Enhanced Calculus and Linear Algebra II	3	T, P														
JC2066	IT Professionals: Ethical, Legal and Social Issues	3			T, P, M					T, P, M	T, P, M						
<b>College Requirement (6 credit units)</b>																	
CS1302	Introduction to Computer Programming	3		T, P		T, P									T	T, P	
<b>Choose <u>one</u> out of the following three courses:</b>																	
PHY1201	General Physics I	3	T, P														
CHEM1300	Principles of General Chemistry	3	T, P														
CHEM1200	Discovery in Biology	3	T, P														
<b>Core Courses (69 credit units)</b>																	
<b>Required CS Courses</b>																	
CS2115	Computer Organization	3	T, P, M	T, P											T	T	
CS2204	Fundamentals of Internet Applications Development	3		T, P, M	T, P	T, P		T			T				T	T, P	

<sup>1</sup> Please include also the College/School required courses

Course			MILOs Consists of 3 elements - Teach (T), Practise (P), Measure (M)											DEC M12			
Code	Title	Credit	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11		A1	A2	A3
CS2310	Computer Programming	3		T, P, M		T, P									T	T, P	
CS2312	Problem Solving and Programming	3		T, P, M	T, P, M	T, P									T	T, P	
CS2402	Introduction to Computational Probability Modelling	3	T, P, M						T, P		T						
CS2611	Seminars on Contemporary Technology I	1			T					T	T, P, M		T		T	T	
CS3103	Operating Systems	3	T, P	T, P	T, P										T	T, P	
CS3201	Computer Networks	3	T, P		T, P										T	T, P	
CS3334	Data Structures	3	T, P	T, P, M											T	T, P	
CS3342	Software Design	3	T, P, M		T, P, M	T, P, M	T, P	T, P, M		T, P, M		T, P, M	T, P, M		T, P	T, P	
CS3343	Software Engineering Practice	3	T, P, M	T, P, M	T, P, M	T, P, M	T, P, M	T, P, M		T		T, P, M	T, P, M		T, P	T, P	M
CS3402	Database Systems	3	T, P	T, P	T, P										T	T, P	
<del>CS3504</del>	<del>IT Professional Placement</del>	<del>12</del>			P, M		P, M	P, M		P, M	M	P, M	P, M		T, P	T, P	
<del>CS3505</del>	<del>IT Professional Internship</del>	<del>9</del>															
CS4335	Design and Analysis of Algorithms	3	T, P	T, P	T, P				T, P, M						T	T, P	
CS4514	Project	9	P	P	P, M	P, M	P, M	P, M	P, M	P	P, M					P	M
<b>Required Supporting Courses</b>																	
EN4262	English Communication Skills for Computing	2					T, P, M										
MA2185	Discrete Mathematics	3	T, P, M												T		
<b>For Normative 4-year Degree</b>																	
<b>Choose <u>one</u> out of the following four courses:</b>																	
GE2313	Global IT Case Studies	3								T, P	T						
GE2324	The Art and Science of Data	3								T, P	T						
GE2338	Internet Applications and Security	3								T, P	T						
GE2340	Artificial Intelligence – Past, Present, and Future	3								T, P	T						
<b>Choose <u>one</u> out of the following four courses:</b>																	
CB2100	Introduction to Financial Accounting	3								T			T				
CB2300	Management	3								T			T				
CB2500	Information Management	3								T			T				
CB2601	Marketing	3								T			T				

Course			MILOs Consists of 3 elements - Teach (T), Practise (P), Measure (M)											DEC M12			
Code	Title	Credit	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11		A1	A2	A3
<b>Electives (15 credit units)</b>																	
<b>Artificial Intelligence Stream : Stream Core</b>																	
CS4486	Artificial Intelligence	3	T, P	P	T, P			P	T, P		T, P				T	T, P	M
CS4487**	Machine Learning	3	T, P		T, P				T, P		T, P				T	T, P	
<b>Choose one out of the following two courses:</b>																	
CS4186#	Computer Vision and Image Processing	3	T, P	P	T, P				T, P		T, P				T	T, P	
CS4386	AI Game Programming	3	T, P	P	T, P			P	T, P						T, P	T, P	
<b>Data Science Stream: Stream Core</b>																	
CS3481	Fundamentals of Data Science	3	T, P	P	T, P				T, P, M		T, P				T, P	T, P	
CS4480	Data-Intensive Computing	3	T, P	P	T, P, M				T, P, M		T, P				T, P	T, P	
CS4487**	Machine Learning	3	T, P		T, P				T, P		T, P				T	T, P	
<b>Information Security Stream : Stream Core</b>																	
CS4286	Internet Security and E-Commerce Protocols	3	T, P	P	T, P, M				T, P, M	T, P	T, P				T, P	T, P	
CS4293	Topics in Cybersecurity	3	T, P	P	T, P				T, P, M	T, P	T, P, M				T	T, P	
CS4394	Information Security and Management	3			T, P				T, P	T, P	T, P				T	T, P	
<b>Multimedia Computing Stream : Stream Core</b>																	
CS3483	Multimodal Interface Design	3			T, P, M				T, P, M		T, P				T	T, P	M
CS4182	Computer Graphics	3	T, P	P	T, P				T, P, M		T, P				T	T, P	
<b>Choose one out of the following four courses:</b>																	
CS4185	Multimedia Technologies and Applications	3	T, P	P	T, P				T, P		T, P				T	T, P	
CS4186#	Computer Vision and Image Processing	3	T, P	P	T, P				T, P		T, P				T	T, P	
CS4187	Computer Vision for Interactivity	3	T, P	P	T, P				T, P		T, P				T	T, P	
CS4188	Virtual Reality	3	T, P		T, P				T, P, M		T, P				T	T, P	
<b>Software Engineering and Project Management Stream : Stream Core</b>																	
<b>Choose three out of the following four courses:</b>																	
CS3346	Software Testing and Maintenance	3	T, P	P		T, P, M			T, P, M		T, P				T	T, P	
CS3356	Managing Software Projects	3	T, P			T, P	T, P	T, P, M	T, P, M	T, P	T, P	T, P			T	T	

Course			MILOs Consists of 3 elements - Teach (T), Practise (P), Measure (M)											DEC M12			
Code	Title	Credit	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11		A1	A2	A3
CS4348	Software Quality Management	3	T, P			T, P	T, P		T, P	T, P	T, P	T, P			T	T, P	
CS4389	Decentralized Applications Development	3		P	T, P, M	T, P	T, P	T, P	T, P		T, P				T	T, P	
<b>Other Electives :</b>																	
CS3185	Computer Architecture	3	T, P						T, P		T, P				T	T, P	
CS3283	Distributed Systems	3	T, P	P	T, P				T, P						T	T, P	
CS3382	Web Usability Design and Engineering	3	T, P		T, P	T, P	P	P, M	T, P	T, P	T, P	T, P			T	T, P	
CS3391	Advanced Programming	3		T, P	T, P				T, P		T, P	T, P			T, P	T, P	
CS4280	Advanced Internet Applications Development	3		P	T, P	T, P		P	T, P		T, P	T, P			T, P	T, P	
CS4284	Mobile Computing	3	T, P		T, P				T, P		T, P				T	T, P	
CS4285	High Speed Multimedia Networks	3	T, P		T, P				T, P		T, P				T	T, P	
CS4288	Cryptographic Algorithms and Protocols	3	T, P	P	T, P				T, P		T, P				T	T, P	
CS4289	Pervasive Computing	3	T, P		T, P				T, P		T, P				T	T, P	
CS4295	Mobile Application Programming	3	T, P	T, P	T, P			P	T, P, M		T, P				T, P	T, P	M
CS4296	Cloud Computing	3	T, P		T, P				T, P		T, P				T	T, P	
CS4297	Cloud Robotics and Automation	3	T, P		T, P				T, P		T, P				T	T, P	
CS4298	iOS Application Development	3	T, P	T, P	T, P			P	T, P, M		T, P				T	T, P	M
CS4367	Computer Games Design	3	T, P	P	T, P			P	T, P	T					T, P	T, P	
CS4381	Advanced Software Design	3			T, P	T, P			T, P						T, P	T, P	
CS4385	Topics in Software Engineering	3	T, P	P		T, P		P	T, P		T, P	T, P			T	T, P	
CS4482	Advanced Database Systems	3	T, P	P	T, P				T, P		T, P				T	T, P	
CS4485	Information Retrieval	3	T, P	P	T, P				T, P		T, P				T	T, P	
CS4552	Guided Study	3	P	P	P			P	P		P, M					P	M
MA2172	Applied Statistics for Sciences and Engineering	3	T, P												T		

*\*Discovery-enriched Curriculum (DEC) elements*

A1: Attitude

*Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.*

A2: Ability

*Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.*

A3: Accomplishments

*Demonstrate accomplishments of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.*

\*\*Same course

#Same course