

BS (Hons)-CS

[Bachelor of Studies (Honours)Computer Science]

ELIGIBILITY CRITERIA:

The candidate has passed the Intermediate or equivalent examination with Mathematics securing at least 50% marks in aggregate from an institution recognized by the Higher Education Commission of Pakistan / Inter Board Committee of Chairmen, Pakistan.

*Equivalency certificate by IBCC will be required in case of education from some other country or system.

- The students who have not studied Mathematics at intermediate level have to pass deficiency courses of Mathematics (06 credits) in first two semesters.

PROGRAM STRUCTURE:

(Program is equivalent to 16 years of education)

Minimum Duration: 4 years; through 8 regular semesters (Fall/Spring)

Minimum Credits: 132

STRUCTURE A- SINGLE MAJOR

The breakup of these 132 Credits is as follows:

Category	Credits	No. of Courses
General Education	39	13
Distribution Courses	39	13
Major	54	18
Internship	Non Credit (compulsory)	-
PLL	Non Credit (compulsory)	-

STRUCTURE B- ONE MAJOR + ONE MINOR

The breakup of these 132 Credits is as follows:

Category	Credits	No. of Courses
General Education	39	13
Distribution Courses	30	10
Major	51	17
Minor	12	4
Internship	Non Credit (compulsory)	-
PLL	Non Credit (compulsory)	-

STRUCTURE C- DOUBLE MAJOR

The breakup of these 132 Credits is as follows:

Category	Credits	No. of Courses
General Education	39	13
Distribution Courses	15	5
Major 1	39	13
Major 2	39	13
Internship	Non Credit (compulsory)	-
PLL	Non Credit (compulsory)	-

STRUCTURE D- SINGLE MAJOR + TWO MINOR

The breakup of these 132 Credits is as follows:

Category	Credits	No. of Courses
General Education	39	13
Distribution Courses	18	6
Major	45	15
Minor 1	15	5
Minor 2	15	5
Internship	Non Credit (compulsory)	-
PLL	Non Credit (compulsory)	-

STRUCTURE E- ASSOCIATE DEGREE (60 CREDIT HOURS)

The breakup of these 60 Credits is as follows:

Category	Credits	No. of Courses
General Education	39	13
Distribution Courses	6	2
Major	15	5

GENERAL EDUCATION - COMPULSORY COURSES

Credits Total: 39

Category	Courses	Code	Title of Course	Credits
Arts & Humanities	2	GENL151	5. Functional Urdu	2
		GENL252	6. Translation of Holy Quran (<i>for Muslim Students</i>) OR	4
		GENL253	Principles of Ethics (<i>for Non-Muslim Students</i>)	4
		GENL324	7. Sports and Exercise Physiology	3
		GENL434	8. Short Film and Drama Production	3
		GENL435	9. Cultural Heritage in Pakistan	3
Natural Sciences	2	GENL121	5. Environmental Sciences	3
		GENL122	6. Fundamentals of Applied Physics	3
		GENL123	7. Every Day Science	3
		GENL124	8. Geography and Natural Resources	3
		GENL125	9. Introduction to Ecology	3
Social Sciences	2	GENL101	6. Introduction to Political Science	3
		GENL102	7. Introduction to International Relations	3
		GENL103	8. Introduction to Sociology	3
		GENL131	9. Population Studies	3
		GENL132	10. Legal Systems of Pakistan	3
		GENL231	11. Gender Studies	3
Expository Writing	3	GENL161	4. Expository 1: Functional Composition & Comprehension	3

		GENL262	5. Expository II: Communication and Academic Writing	3
		GENL263	6. Exposition III: Technical writing & Presentation Skills	3
Quantitative Reasoning	2	GENL111	7. Elements of Statistics & Probability	3
		GENL112	8. General Mathematics	3
		GENL113	9. Introduction to Mathematical Reasoning	3
		GENL114	10. Introduction to Information and Communication Technology	3+1
		GENL115	11. Logic and Critical Thinking	3
Islamiyat / Moral Values	1	GENL141	2. Fundamentals of Islamic Studies (For Muslim Students) OR	3
		GENL142	Moral Values (for Non-Muslim Students)	3
Pakistan Studies	1	GENL143	Pakistan Studies	3

LIST OF DISTRIBUTION COURSES

No. of Distribution courses for Single Major:	13 courses (39 credits)
No. of Distribution courses for Double Major:	5 courses (15 credits)
No. of Distribution courses for Single Major and One Minor:	10 courses (30 credits)
No. of Distribution courses for Single Major and Two Minors:	6 courses (18 credits)
No. of Distribution courses for Associate Degree Program:	2 courses (6 credits)

	<u>Code</u>	<u>Title of Course</u>	<u>Credits</u>
Political Science			
1	PSIR-432	Politics of South Asia	3
2	PSIR-302	Comparative Political Systems of Developing States	3
3	PSIR-319	Contemporary Political Ideologies	3
4	PSIR-334	Major Issues in Pakistan's Politics	3
5	PSIR- 221	Introduction to Local Government System	3
International Relations			
1	PSIR-442	Contemporary Regional and International Issues	3
2	PSIR-432	Politics of South Asia	3
3	PSIR- 431	Major Issues of Muslim World	3
4	PSIR-322	Conflict and Conflict Resolution	3
5	PSIR -303	Comparative Political Systems of Developed States	3
Psychology			
1	PSY101	Introduction to Psychology	3
2	PSY121	Theories of personality	3
3	PSY112	Social Psychology	3
4	PSY412	Positive Psychology	3

5	PSY413	Attachment and Relationship	3
<u>Sociology</u>			
1	SOCL 132	Pakistani Society and Culture	3
2	SOCL 331	Sociology of Emotions and Human Feelings	3
3	SOCL 341	Criminology and Society	3
4	SOCL 421	Sociology of Globalization	3
5	SOCL 441	Human Rights and Citizenship	3
6	SOCL 442	Sociological Approaches to Conflict Resolution	3
7	SOCL 231	Gender Studies	3
<u>Economics</u>			
1	ECON 272	Comparative Economic system	3
2	ECON 141	Introduction to Development Economics	3
3	ECON275	Islamic Economics	3
4	ECON271	Issues in Pakistan's Economy	3
5	ECON 101	Introduction to economics	3
<u>Education</u>			
1	Edu-211	School, Community and Teacher	3
2	Edu-241	Assessment and Evaluation in Classroom	3
3	Edu-315	Critical Thinking and Reflective Practices	3
4	Edu-272	Principles of Guidance and Counseling	3
5	Edu-313	Contemporary Trends and Issues in Education	3
<u>Computer Sciences & IT</u>			
1	CRSC111	Basic Electronics	3
2	CRSC112	Applied Physics	3
3	CRSC116	Communication and Presentation Skills	3
4	CRSC117	Logic and Critical Thinking	3
5	CRSC121	Programming Fundamentals	3
6	CRSC225	Web Engineering	3
7	CRSC241	Database Systems	3
8	CRSC251	Introduction to Software Engineering	3
9	CRSC331	Computer Networks	3
10	CRSC341	Enterprise Systems	3
11	CRSC342	Business Process Engineering	3
12	CRSC343	Fundamentals of Graph Theory	3
13	CRSC344	Theory of Programming Languages	3
14	CRSC353	Software Requirements Engineering	3
15	CRSC381	Research Methodology for CSC	3
16	CRSC382	Operations Research	3
17	CRSC383	Stochastic Processes	3
18	CRSC422	Information Security	3
19	CRSC452	Formal Methods	3
20	CRSC453	Modeling and Simulation	3

Physical Education & Sports Science			
1	SPSC121	Basics of Human Anatomy	3
2	SPSC122	Introduction to Sports Physiology	3
3	SPSC111	Philosophical Basis of Physical Education	3
4	SPSC112	Rules and Techniques of the Games	3
5	SPSC212	Science of Track and Field	3
Mathematics			
1	MATH111	Logic and Set Theory	3
2	MATH112	Discrete Structures for CSC	3
3	MATH233	Differential Equations	3
4	MATH212	Linear Algebra for CSC	3
5	MATH113	Calculus and Analytical Geometry for CSC	3
6	MATH312	Algebra I	3
7	MATH131	Calculus I	3
8	MATH201	History of Mathematics	3
9	MATH231	Linear Algebra I	3
10	MATH 321	Numerical Methods and Computation	3
11	MATH 333	Multivariable Calculus for CSC	3
Management Sciences			
1	BUSS101	Introduction to Business	3
2	BUSS141	Principles of Human Resource Management	3
3	BUSS102	Management Principles and Application	3
4	BUSS104	Business on Internet	3
5	BUSS103	Principles and Practices of Marketing	3
6	BUSS107	Digital Banking	3
7	BUSS106	Banking and Financial Markets	3
8	BUSS105	Digital and Social Media Marketing	3
9	BUSS206	Fundamentals of Project Management	3
10	BUSS205	Business and Society	3
11	BUSS204	Professional Practices for Future Leaders	3
12	BUSS121	Principles of Business Finance	3
13	BUSS203	Business Ethics	3
14	BUSS202	Cross-border Business	3
15	BUSS201	Business Investment Decisions	3
16	BUSS109	Legal Mechanism of Business	3
17	BUSS108	Islamic Banking Systems	3
Accounting & Finance			
1	ACCT111	Financial Accounting	3
Law			
1	LAW101	Introduction to Law	3
2	LAW214	Human Rights Law	3
3	LAW483	Law of Contract	3
4	LAW484	Islamic Personal Law	3

5	LAW335	Law of Business Organizations	3
6	LAW421	Constitutional History in Pakistan	3
Mass Communications			
1	MCOM101	Introduction to Journalism & Mass Communication	3
2	MCOM211	Journalistic English	3
3	MCOM111	Introduction to Social Media	3
4	MCOM322	Data Journalism	3
5	MCOM231	Broadcast Journalism	3
6	MCOM221	News Reporting and Writing	3
English			
1	ENGL103	Introduction to Language & Linguistics	3
2	ENGL422	Issues in Syntax	3
3	ENGL102	Intro to Literary Device & Genre of Literature	3
4	ENGL555	IELTS through short stories	3
5	ENGL559	Introduction to Essentials of Proposal papers & Journals	3
6	ENGL 304	Popular Fiction	3
Islamic Studies			
1	ISLM313	قرآن کا انسانی مطلوب	3
2	ISLM371	اسلام اور جدید چیلنجز	3
3	ARAB111	آسان عربی بول چال	3
4	ISLM472	تزکیہ و تصوف (کیریکٹریبلڈنگ)	3
5	ISLM333	غذائیں حلال و حرام اسلامی حکام	3
6	ISLM231	اسلامی فقہ اور عملی زندگی کے مسائل	3
Urdu			
1	URDU371	نظم کا مطالعہ	3
2	URDU411	ناول کا مطالعہ	3
3	URDU211	شعر جنہی	3
4	URDU313	شعری اصناف	3
5	URDU111	عملی قواعد اردو	3

COURSES OF STUDY:

(Information about the Prerequisites (if any) of the course(s) will be provided by the Department at the beginning of the program)

COURSE FOR MAJORING IN COMPUTER SCIENCE :

A) Single Major in Computer Science (without any Minor)

Credits Total: 39

Course Code	Title of Course	Credits
CRSC211	Digital Logic Design	3
CRSC221	Object Oriented Programming	4
CRSC222	Data Structure and Algorithms	4
CRSC223	Operating Systems	3
CRSC311	Theory of Automata	3
CRSC312	Artificial Intelligence	3
CRSC323	Design and Analysis of Algorithms	3
CRSC324	Compiler Construction	3
CRSC326	Computer Architecture and Assembly Language	4
CRSC434	Parallel and Distributed Computing	3
CRSC482	Final Year Project for CRSC	6

Electives Courses Total: 15 Credits

Subject to University offerings, the student shall opt five from the list below:

Course Code	Title of Course	Credits
CRSC232	Telecom Systems	3
CRSC273	Mobile Application Development	3
CRSC274	E-Commerce	3
CRSC275	Visual Programming	3
CRSC301	Human Computer Interaction	3
CRSC332	Network Management	3
CRSC335	Internet Architecture and Protocols	3
CRSC336	Information Systems	3
CRSC341	Topics in Database Management Systems	3
CRSC345	Knowledge Based Systems	3
CRSC456	Principles of Cloud Computing	3
CRSC467	Internet of Things	3
CRSC469	System Programming	3

B) Major in Computer Science (alongside One Minor) Total: 39 Credits

Course Code	Title of Course	Credits
CRSC211	Digital Logic Design	3
CRSC221	Object Oriented Programming	4
CRSC222	Data Structure and Algorithms	4
CRSC223	Operating Systems	3
CRSC311	Theory of Automata	3
CRSC312	Artificial Intelligence	3
CRSC323	Design and Analysis of Algorithms	3
CRSC324	Compiler Construction	3
CRSC326	Computer Architecture and Assembly Language	4
CRSC434	Parallel and Distributed Computing	3
CRSC482	Final Year Project for CRSC	6

Electives Courses Total: 12 Credits

Subject to University offerings, the student shall opt four from the list below:

Course Code	Title of Course	Credits
CRSC232	Telecom Systems	3
CRSC273	Mobile Application Development	3
CRSC274	E-Commerce	3
CRSC275	Visual Programming	3
CRSC301	Human Computer Interaction	3
CRSC332	Network Management	3
CRSC335	Internet Architecture and Protocols	3
CRSC336	Information Systems	3
CRSC341	Topics in Database Management Systems	3
CRSC345	Knowledge Based Systems	3
CRSC456	Principles of Cloud Computing	3
CRSC467	Internet of Things	3
CRSC469	System Programming	3

C) Major in Computer Science (alongside another Major in SE or IT)

Total: 39 Credits

Subject to University offerings, the student shall opt 39 credits from the list below:

<u>Code</u>	<u>Title of Course</u>	<u>Credits</u>
CRSC211	Digital Logic Design	3
CRSC121	Programming Fundamentals	4
CRSC221	Object Oriented Programming	4
CRSC222	Data Structure and Algorithms	4
CRSC242	Database Management Systems	4
CRSC311	Theory of Automata	3
CRSC312	Artificial Intelligence	3
CRSC331	Computer Networks	4
CRSC343	Fundamentals of Graph Theory	3
CRSC344	Theory of Programming Languages	3
CRSC323	Design and Analysis of Algorithms	3
CRSC324	Compiler Construction	3
CRSC326	Computer Architecture and Assembly Language	4
CRSC434	Parallel and Distributed Computing	3
CRSC482	Final Year Project for CRSC	6

D) Major in Computer Science (alongside another Major)

Total: 39 Credits

<u>Course Code</u>	<u>Title of Course</u>	<u>Credits</u>
CRSC121	Programming Fundamentals	4
CRSC221	Object Oriented Programming	4
CRSC222	Data Structure and Algorithms	4
CRSC242	Database Management Systems	4
CRSC251	Introduction to Software Engineering	3
CRSC311	Theory of Automata	3
CRSC312	Artificial Intelligence	3
CRSC331	Computer Networks	4
CRSC381	Computer Architecture and Assembly Language	4
CRSC482	Final Year Project for CRSC	6

E) Major in Computer Science (alongside two Minors) *Total: 45 Credits*

Course Code	Title of Course	Credits
CRSC121	Programming Fundamentals	4
CRSC211	Digital Logic Design	3
CRSC221	Object Oriented Programming	4
CRSC222	Data Structure and Algorithms	4
CRSC223	Operating Systems	3
CRSC242	Database Management Systems	4
CRSC251	Introduction to Software Engineering	3
CRSC311	Theory of Automata	3
CRSC312	Artificial Intelligence	3
CRSC331	Computer Networks	4
CRSC381	Computer Architecture and Assembly Language	4
CRSC482	Final Year Project for CRSC	6

**F) Major in Computer Science (for Associate Degree Program)
*Total: 5 courses***

Course Code	Title of Course	Credits
CRSC121	Programming Fundamentals	4
CRSC222	Data Structure and Algorithms	3
CRSC242	Database Management Systems	4
CRSC293	Web Engineering	3
CRSC276	Modern Programming Language	4

COURSE FOR MINOR IN COMPUTER SCIENCE :

Minor in Computer Science (alongside Major in another discipline) *Total: 4 courses*

Course Code	Title of Course	Credits
CRSC121	Programming Fundamentals	4
CRSC222	Data Structure and Algorithms	3
CRSC242	Database Management Systems	4
CRSC293	Web Engineering	3

Minor in Computer Science (alongside Major and Minor in another discipline)

Total: 5 courses

<u>Course Code</u>	<u>Title of Course</u>	<u>Credits</u>
CRSC121	Programming Fundamentals	4
CRSC222	Data Structure and Algorithms	3
CRSC242	Database Management Systems	4
CRSC293	Web Engineering	3
CRSC331	Computer Networks	4

Minor in Artificial Intelligence

Total: 4 or 5 courses

Student will study 4 courses in case of single minor alongside one Major and 5 courses in case of double minor alongside one Major and one Minor from offered courses.

<u>Course Code</u>	<u>Title of Course</u>	<u>Credits</u>
CRSC413	Intro to Machine Learning	3
CRSC414	Programming for Artificial Intelligence	3
CRSC415	Artificial Neural Networks	3
CRSC416	Computer Vision and Natural Language Processing	3
CRSC417	Knowledge Representation & Reasoning	3

Minor in Data Science

Total: 5 or 4 courses

Student will study 4 courses in case of single minor alongside one Major and 5 courses in case of double minor alongside one Major and one Minor from offered courses.

<u>Course Code</u>	<u>Title of Course</u>	<u>Credits</u>
CRSC438	Introduction to Data Science	3
CRSC441	Data Mining	3
CRSC443	Data Warehousing and Business Intelligence	3
CRSC445	Big Data Analytics	3
CRSC444	Data Visualization	3

Minor in Application Development and Design

Total: 5 or 4 courses

Student will study 4 courses in case of single minor alongside one Major and 5 courses in case of double minor alongside one Major and one Minor from offered courses.

<u>Course Code</u>	<u>Title of Course</u>	<u>Credits</u>
CRSC227	Web Design and Development	3
CRSC273	Mobile Application Development	3
CRSC275	Visual Programming	3
CRSC276	Game Design & Development	3
CRSC469	System and Network Programming	3