

## Dean's Message

Welcome to the FAST School of Computing. We are the pioneers of Computing education in the country. In 1985, we started as a small and affiliated institute and today we have expanded to five cities of the country - offering five bachelor's degree programs, six master's degree programs, and two PhD degree programs within the FAST School of Computing. In addition, we also offer two specialization streams within the BS (CS) degree program.

With the emergence of innovative technologies such as Generative AI, Deep Learning, Data Science, Blockchain, Cyber Security, Cloud Computing, Gaming, Robotics, and IoT, our focus has been to make an innovative impact through their integration and application. Computing has a massive potential in our socio-economic development. Realizing this potential, our aim has been to empower the youth with capabilities, innovation, learning, and entrepreneurship.

The School of Computing takes honors in leading the computing education of the country. Our graduates have been playing an active and leading role, both at the national as well as the international level. We have also established collaborations with several organizations and universities. In a recently concluded survey, P@SHA – the computing industrial representative of the country, placed us as the top ranked university among all the universities of the country, which offers computing education.

Through our outstanding faculty, funded research, impactful publications, innovative ideas, well-equipped labs, and strong alliance with the industry, we strive to provide an environment which can nourish the young talent. We offer a variety of academic programs through which students can inspire to



### **Dr Jawwad Ahmed Shamsi**

Professor and Dean (Computing)

[PhD Approved Supervisor](#)

PhD (CS), Wayne State University, USA (2009)

MS (CS), University of Michigan-Dearborn, USA (2002)

BE (EE), NED-UET, Karachi (1998)

choose their desired specialization of studies. We aim to offer personalized growth and opportunities to students so that they can enrich their talent and build upon their skills using curricular, co-curricular, and extra-curricular activities at the university.

I would like to invite you to explore the variety of opportunities offered by the University. I hope you will find the information useful. Please do not hesitate to contact us in case of any questions. My team and I will be glad to assist you.

# BS Admission Test, Eligibility and Selection Criteria

		Computing
<b>Degrees</b>		Bachelor of Science (Artificial Intelligence) Bachelor of Science (Computer Science) Bachelor of Science (Cyber Security) Bachelor of Science (Data Science) Bachelor of Science (Software Engineering)
<b>Admission Test</b>	Applicant must select <b>only one</b> out of the three admission test options	FAST-NUCES SAT (minimum score of 1200 or more) NTS NAT-IE, NAT-ICS
<b>Eligibility</b>	1	SSC (Matric) or an equivalent examination 60% minimum marks
	2	HSSC (FSc) or an equivalent examination 50% minimum marks
	3	Courses studied at HSSC or equivalent level Mathematics
<b>Selection Criteria</b>	1	Weightage of Admission Test marks 50%
	2	Weightage of HSSC/equivalent 40% <sup>1</sup>
	3	Weightage of SSC/equivalent 10%

## Computing Domain

Pre-medical students who have passed additional maths or are awaiting results are eligible to take admission in all computing programs.

<sup>1</sup>Weightage of HSSC marks shall be calculated based on (whichever is applicable) at the time of compilation of merit list

- a. HSSC part I and II OR
- b. HSSC part I if HSSC part II not available OR
- c. IBCC equivalence of A-level OR
- d. IBCC equivalence of O-level

Merit cut-off marks to be determined by the University

**NOTE:** All documents/transcripts will be checked at the time of admission. Any incorrect/false information submitted by the applicant or any attempt to hide information will lead to disqualification of the candidate.



# Bachelor of Science (Artificial Intelligence)

## Program Mission

To provide theoretical knowledge and practical skills required for a professional career in Artificial Intelligence. The degree program follows Artificial Intelligence in breadth, covering core computing concepts with a specialization in Artificial Intelligence and its application within the code of ethics.

## Career Opportunities

You may become risk manager reporting analyst, project manager enterprise analyst, data engineer machine learning engineer, Artificial Intelligence developer etc.

## Award of Degree

For the award of Bachelor of Science (Artificial Intelligence) degree, a student must have

- Passed courses totaling at least 133 credit hours, including all core courses
- Earned CGPA of at least 2.00



Eligibility for FYP-I: 95 CH

Domain	Cr. Hrs
Computing Core	52
General Education	30
Maths and Supporting Courses	12
Domain Core	21
Domain Elective	15
Elective Supportive Courses	3
<b>Total</b>	<b>133</b>

## Tentative Study Plan-Bachelor of Science (Artificial Intelligence)

Code	Title	Cr.Hrs		Prereq
<b>Semester-I</b>				
CL1000	Introduction to Information and Communication Technology	0	1	
CS1002	Programming Fundamentals	3	1	
NS1001	Applied Physics	3	0	
MT1003	Calculus and Analytical Geometry	3	0	
SS1012	Functional English	2	1	
SS1013	Ideology and Constitution of Pakistan	2	0	
	<b>Total</b>	<b>13</b>	<b>3</b>	
<b>Semester-II</b>				
CS1004	Object Oriented Programming	3	1	CS1002
EE1005	Digital Logic Design	3	1	
MT1006	Multivariable Calculus	3	0	MT1003
SS1007	Islamic Studies/Ethics	2	0	
SS1014	Expository Writing	2	1	
SS3002	Civics and Community Engagement	2	0	
	<b>Total</b>	<b>15</b>	<b>3</b>	
<b>Semester-III</b>				
CS2001	Data Structures	3	1	CS1004
EE2003	Computer Organization and Assembly Language	3	1	EE1005
CS1005	Discrete Structures	3	0	
MT1004	Linear Algebra	3	0	
AI2001	Programming for AI	3	1	
SS/MG	SS/MG Elective - I	2	0	
	<b>Total</b>	<b>17</b>	<b>3</b>	
<b>Semester-IV</b>				
CS2005	Database Systems	3	1	CS2001
AI2002	Artificial Intelligence	3	1	
CS2006	Operating Systems	3	1	CS2001
CS2004	Fundamentals of Software Engineering	3	0	
MT2005	Probability and Statistics	3	0	
	<b>Total</b>	<b>15</b>	<b>3</b>	
<b>Semester-V</b>				
AI3002	Machine Learning	3	1	AI2001
AI3001	Knowledge Representation and Reasoning	3	0	AI2001
CS2009	Design and Analysis of Algorithms	3	0	CS2001
CS3001	Computer Networks	3	1	CS2001
SS2007	Technical and Business Writing	3	0	SS1014
	<b>Total</b>	<b>15</b>	<b>2</b>	
<b>Semester-VI</b>				
AI3003	Artificial Neural Networks	3	0	AI2001
AI4002	Computer Vision	3	1	AI3002
CS3006	Parallel and Distributed Computing	3	0	CS2006
Alxxxx	AI Elective - I	3	0	
CSxxxx	Computing Internship	0	1	
	<b>Total</b>	<b>12</b>	<b>2</b>	
<b>Semester-VII</b>				
AI4091	Final Year Project - I	0	3	
CS3002	Entrepreneurship	3	0	
Alxxxx	AI Elective - II	3	0	
Alxxxx	AI Elective - III	3	0	
SS/MG	SS/MG Elective - II	3	0	
	<b>Total</b>	<b>12</b>	<b>3</b>	
<b>Semester-VIII</b>				
AI4092	Final Year Project - II	0	3	AI4091
CS3002	Information Security	3	0	
CS4001	Professional Practices	3	0	
Alxxxx	AI Elective - IV	3	0	
Alxxxx	AI Elective - V	3	0	
	<b>Total</b>	<b>12</b>	<b>3</b>	

# Bachelor of Science (Computer Science)

## Program Mission

To provide the theoretical and practical knowledge and skills required for a professional career in computing. The degree program follows Computer Science in breadth covering core computer science and its application within a code of ethics.

## Career Opportunities

The graduates holding Bachelor of Science (Computer Science) degree will be able to adopt a wide range of careers, including computer programmer, software Engineer Software developer Web Game and Mobile App developer Software quality engineer, and graphics designer etc.

## Award of Degree

For the award of Bachelor of Science (Computer Science) degree, a student must have

- Passed courses totaling at least 133 credit hours, including all core courses
- Earned CGPA of at least 2.00



Eligibility for FYP-I: 95 CH

Domain	Cr. Hrs
Computing Core	52
General Education	30
Maths and Supporting Courses	12
Domain Core	18
Domain Elective	18
Elective Supportive Courses	3
<b>Total</b>	<b>133</b>

## Tentative Study Plan-Bachelor of Science (Computer Science)

Code	Title	Cr.Hrs		Prereq
<b>Semester-I</b>				
CL1000	Introduction to Information and Communication Technology	0	1	
CS1002	Programming Fundamentals	3	1	
NS1001	Applied Physics	3	0	
MT1003	Calculus and Analytical Geometry	3	0	
SS1012	Functional English	2	1	
SS1013	Ideology and Constitution of Pakistan	2	0	
	<b>Total</b>	<b>13</b>	<b>3</b>	
<b>Semester-II</b>				
CS1004	Object Oriented Programming	3	1	CS1002
EE1005	Digital Logic Design	3	1	
MT1006	Multivariable Calculus	3	0	MT1003
SS1007	Islamic Studies/Ethics	2	0	
SS1014	Expository Writing	2	1	
SS3002	Civics and Community Engagement	2	0	
	<b>Total</b>	<b>15</b>	<b>3</b>	
<b>Semester-III</b>				
CS2001	Data Structures	3	1	CS1004
EE2003	Computer Organization and Assembly Language	3	1	EE1005
CS1005	Discrete Structures	3	0	
MT1004	Linear Algebra	3	0	
CS3005	Theory of Automata	3	0	
SS/MGxxxx	SS/MG Elective - I	2	0	
	<b>Total</b>	<b>17</b>	<b>2</b>	
<b>Semester-IV</b>				
CS2005	Database Systems	3	1	CS2001
AI2002	Artificial Intelligence	3	1	
CS2006	Operating Systems	3	1	CS2001
CS3009	Software Engineering	3	0	
MT2005	Probability and Statistics	3	0	
	<b>Total</b>	<b>15</b>	<b>3</b>	
<b>Semester-V</b>				
EE2013	Computer Architecture	3	0	EE2003
CS3014	Applied Human Computer Interaction	3	0	
CS2009	Design and Analysis of Algorithms	3	0	CS2001
CS3001	Computer Networks	3	1	CS2001
SS2007	Technical and Business Writing	3	0	SS1014
	<b>Total</b>	<b>15</b>	<b>1</b>	
<b>Semester-VI</b>				
CS4031	Compiler Construction	3	0	CS3005
CS4087	Advanced DBMS	3	0	CS2005
CS3006	Parallel and Distributed Computing	3	0	CS2006
CSxxxx	CS Elective - I	3	0	
CSxxxx	CS Elective - II	3	0	
CSxxxx	Computing Internship	0	1	
	<b>Total</b>	<b>15</b>	<b>1</b>	
<b>Semester-VII</b>				
CS4091	Final Year Project - I	0	3	
CS3002	Entrepreneurship	3	0	
CSxxxx	CS Elective - III	3	0	
CSxxxx	CS Elective - IV	3	0	
SS/MGxxxx	SS/MG Elective - II	3	0	
	<b>Total</b>	<b>12</b>	<b>3</b>	
<b>Semester-VIII</b>				
CS4092	Final Year Project - II	0	3	CS4091
CS3002	Information Security	3	0	
CS4001	Professional Practices	3	0	
CSxxxx	CS Elective - V	3	0	
CSxxxx	CS Elective - VI	3	0	
	<b>Total</b>	<b>12</b>	<b>3</b>	

# Bachelor of Science (Cyber Security)

## Program Mission

To provide theoretical knowledge and practical skills required for a professional career in computing and Cyber Security. The degree program follows Cyber Security in breadth covering core computing with a specialization in Cyber Security and its application within a code of ethics

## Career Opportunities

You may become Cyber Security specialist, Cyber Security analyst Cybercrime analyst, Cyber Security consultant, IT auditor, Information security manager/administrator information assurance engineer, IT security consultant, digital forensics analyst, penetration and vulnerability tester etc.

## Award of Degree

For the award of Bachelor of Science (Cyber Security) degree, a student must have

- Passed courses totaling at least 133 credit hours, including all core courses
- Earned CGPA of at least 2.00



Eligibility for FYP-I: 95 CH

Domain	Cr. Hrs
Computing Core	52
General Education	30
Maths and Supporting Courses	12
Domain Core	21
Domain Elective	15
Elective Supportive Courses	3
<b>Total</b>	<b>133</b>

## Tentative Study Plan-Bachelor of Science (Cyber Security)

Code	Title	Cr.Hrs		Prereq
<b>Semester-I</b>				
CL1000	Introduction to Information and Communication Technology	0	1	
CS1002	Programming Fundamentals	3	1	
NS1001	Applied Physics	3	0	
MT1003	Calculus and Analytical Geometry	3	0	
SS1012	Functional English	2	1	
SS1013	Ideology and Constitution of Pakistan	2	0	
	<b>Total</b>	<b>13</b>	<b>3</b>	
<b>Semester-II</b>				
CS1004	Object Oriented Programming	3	1	CS1002
EE1005	Digital Logic Design	3	1	
MT1006	Multivariable Calculus	3	0	MT1003
SS1007	Islamic Studies/Ethics	2	0	
SS1014	Expository Writing	2	1	
SS3002	Civics and Community Engagement	2	0	
	<b>Total</b>	<b>15</b>	<b>3</b>	
<b>Semester-III</b>				
CS2001	Data Structures	3	1	CS1004
EE2003	Computer Organization and Assembly Language	3	1	EE1005
CS1005	Discrete Structures	3	0	
MT1004	Linear Algebra	3	0	
CY2004	Cyber Security	3	0	
SS/MG	SS/MG Elective - I	2	0	
	<b>Total</b>	<b>17</b>	<b>2</b>	
<b>Semester-IV</b>				
CS2009	Design and Analysis of Algorithms	3	0	CS2001
SS2007	Technical and Business Writing	3	0	SS1014
CS3001	Computer Networks	3	1	CS2001
CS3009	Software Engineering	3	0	
MT2005	Probability and Statistics	3	0	
	<b>Total</b>	<b>15</b>	<b>1</b>	
<b>Semester-V</b>				
CS3002	Information Security	3	0	
CS2006	Operating Systems	3	1	CS2001
CS2005	Database Systems	3	1	CS2001
AI2002	Artificial Intelligence	3	1	
CYxxxx	CY Elective - I	3	0	
	<b>Total</b>	<b>15</b>	<b>3</b>	
<b>Semester-VI</b>				
CY3001	Network Security	3	1	CS3001
CY3006	Digital Forensics	3	1	CY2004
CY4001	Secure Software Design and Development	3	1	CS3009
CYxxxx	CY Elective - II	3	0	
CSxxxx	Computing Internship	0	1	
	<b>Total</b>	<b>12</b>	<b>4</b>	
<b>Semester-VII</b>				
CY4091	Final Year Project I	0	3	
CS4001	Professional Practices	3	0	
CS3006	Parallel and Distributed Computing	3	0	CS2006
CYxxxx	CY Elective - III	3	0	
SSxxxx	SS/MG Elective - II	3	0	
	<b>Total</b>	<b>12</b>	<b>3</b>	
<b>Semester-VIII</b>				
CY4092	Final Year Project II	0	3	CY4091
CY3003	Information Assurance	3	0	
CS3002	Entrepreneurship	3	0	
CYxxxx	CY Elective - IV	3	0	
CYxxxx	CY Elective - V	3	0	
	<b>Total</b>	<b>12</b>	<b>3</b>	

# Bachelor of Science (Data Science)

## Program Mission

To provide theoretical knowledge and practical skills required for a professional career in computing and Data Science. The degree program follows Data Science in breadth covering core computing with a specialization in Data Science and its application within a code of ethics.

## Career Opportunities

You may become Bachelor of Science (Data Science) scientist business analyst, big data analyst social networks analyst, data engineering, decision scientist, data quality assurance experts, business analyst, business intelligence analyst, data consultant ,data associate, database developer software engineer, machine learning engineer etc.

## Award of Degree

For the award of Bachelor of Science (Data Science) degree, a student must have

- Passed courses totaling at least 133 credit hours, including all core courses
- Earned CGPA of at least 2.00



Eligibility for FYP-I: 95 CH

Domain	Cr. Hrs
Computing Core	52
General Education	30
Maths and Supporting Courses	12
Domain Core	21
Domain Elective	15
Elective Supportive Courses	3
<b>Total</b>	<b>133</b>

## Tentative Study Plan-Bachelor of Science (Data Science)

Code	Title	Cr.Hrs	Prereq
<b>Semester-I</b>			
CL1000	Introduction to Information and Communication Technology	0	1
CS1002	Programming Fundamentals	3	1
NS1001	Applied Physics	3	0
MT1003	Calculus and Analytical Geometry	3	0
SS1012	Functional English	2	1
SS1013	Ideology and Constitution of Pakistan	2	0
	<b>Total</b>	<b>13</b>	<b>3</b>
<b>Semester-II</b>			
CS1004	Object Oriented Programming	3	1 CS1002
EE1005	Digital Logic Design	3	1
MT2008	Multivariable Calculus	3	0 MT1003
SS1007	Islamic Studies/Ethics	2	0
SS1014	Expository Writing	2	1
SS3002	Civics and Community Engagement	2	0
	<b>Total</b>	<b>15</b>	<b>3</b>
<b>Semester-III</b>			
CS2001	Data Structures	3	1 CS1004
EE2003	Computer Organization and Assembly Language	3	1 EE1005
CS1005	Discrete Structures	3	0
MT1004	Linear Algebra	3	0
DS2001	Introduction to Data Science	3	1
SS/MGxxxx	SS/MG Elective - I	2	0
	<b>Total</b>	<b>17</b>	<b>3</b>
<b>Semester-IV</b>			
CS2005	Database Systems	3	1 CS2001
DS2003	Advanced Statistics	3	0
CS2006	Operating Systems	3	1 CS2001
CS2004	Fundamentals of Software Engineering	3	0
MT2005	Probability and Statistics	3	0
	<b>Total</b>	<b>15</b>	<b>2</b>
<b>Semester-V</b>			
DS3003	Data Warehousing and Business Intelligence	3	1 CS2005
DS3001	Data Analysis and Visualization	3	1 DS2001
CS2009	Design and Analysis of Algorithms	3	0 CS2001
AI2002	Artificial Intelligence	3	1
SS2007	Technical and Business Writing	3	0 SS1014
	<b>Total</b>	<b>15</b>	<b>3</b>
<b>Semester-VI</b>			
CS3006	Parallel and Distributed Computing	3	0 CS2006
DS3002	Data Mining	3	0 CS2001
CS3001	Computer Networks	3	1 CS2001
DSxxxx	DS Elective - I	3	0
CSxxxx	Computing Internship	0	1
	<b>Total</b>	<b>12</b>	<b>2</b>
<b>Semester-VII</b>			
DS4091	Final Year Project - I	0	3
MG4011	Entrepreneurship	3	0
DSxxxx	DS Elective - II	3	0
DSxxxx	DS Elective - III	3	0
SS/MG	SS/MG Elective - II	3	0
	<b>Total</b>	<b>12</b>	<b>3</b>
<b>Semester-VIII</b>			
DS4092	Final Year Project - II	0	3 DS4091
CS3002	Information Security	3	0
CS4001	Professional Practices	3	0
DSxxxx	DS Elective - IV	3	0
DSxxxx	DS Elective - V	3	0
	<b>Total</b>	<b>12</b>	<b>3</b>

# Bachelor of Science (Software Engineering)

## Program Mission

To provide theoretical knowledge and practical skills required for a professional career in computing and Software Engineering. The degree program follows Software Engineering in breadth covering core computing with a specialization in Data Science and its application within a code of ethics.

## Career Opportunities

The graduates of Bachelor of Science (Software Engineering) Degree may become software quality assurance engineer, systems programmer Embedded Software Engineer, Software architect, chief technology officer, chief information officer user interface designer, information system manager or computer graphic designer etc.

## Award of Degree

For the award of Bachelor of Science (Software Engineering) degree, a student must have

- Passed courses totaling at least 133 credit hours, including all core courses
- Earned CGPA of at least 2.00



Eligibility for FYP-I: 95 CH

Domain	Cr.Hrs
Computing Core	52
General Education	30
Maths and Supporting Courses	12
Domain Core	18
Domain Elective	18
Elective Supportive Courses	3
<b>Total</b>	<b>133</b>

## Tentative Study Plan-Bachelor of Science (Software Engineering)

Code	Title	Cr.Hrs	Prereq	
<b>Semester-I</b>				
CL1000	Introduction to Information and Communication Technology	0	1	
CS1002	Programming Fundamentals	3	1	
NS1001	Applied Physics	3	0	
MT1003	Calculus and Analytical Geometry	3	0	
SS1012	Functional English	2	1	
SS1013	Ideology and Constitution of Pakistan	2	0	
	<b>Total</b>	<b>13</b>	<b>3</b>	
<b>Semester-II</b>				
CS1004	Object Oriented Programming	3	1	CS1002
EE1005	Digital Logic Design	3	1	
MT1006	Multivariable Calculus	3	0	MT1003
SS1007	Islamic Studies/Ethics	2	0	
SS1014	Expository Writing	2	1	
SS3002	Civics and Community Engagement	2	0	
	<b>Total</b>	<b>15</b>	<b>3</b>	
<b>Semester-III</b>				
CS2001	Data Structures	3	1	CS1004
EE2003	Computer Organization and Assembly Language	3	1	EE1005
CS1005	Discrete Structures	3	0	
MT1004	Linear Algebra	3	0	
SE1001	Introduction to Software Engineering	3	0	
SS/ MGxxxx	SS/MG Elective-I	2	0	
	<b>Total</b>	<b>17</b>	<b>2</b>	
<b>Semester-IV</b>				
CS2005	Database Systems	3	1	CS2001
SE2001	Software Requirements Engineering	3	0	SE1001
CS2006	Operating Systems	3	1	CS2001
SE2002	Software Design and Architecture	3	0	CS1004
MT2005	Probability and Statistics	3	0	
	<b>Total</b>	<b>15</b>	<b>2</b>	
<b>Semester-V</b>				
SE3004	Software Construction and Development	3	0	SE2002
SE3002	Software Quality Engineering	3	0	SE1001
CS2009	Design and Analysis of Algorithms	3	0	CS2001
AI2002	Artificial Intelligence	3	1	
SS2007	Technical and Business Writing	3	0	SS1014
	<b>Total</b>	<b>15</b>	<b>1</b>	
<b>Semester-VI</b>				
CS3006	Parallel and Distributed Computing	3	0	CS2006
SE4002	Fund. of Software Project Management	3	0	SE2001
CS3001	Computer Networks	3	1	CS2001
SExxxx	SE Elective - I	3	0	
SExxxx	SE Elective - II	3	0	
CSxxxx	Computing Internship	0	1	
	<b>Total</b>	<b>15</b>	<b>2</b>	
<b>Semester-VII</b>				
SE4091	Final Year Project-I	0	3	
MG4011	Entrepreneurship	3	0	
SExxxx	SE Elective - III	3	0	
SExxxx	SE Elective - IV	3	0	
SS/ MGxxxx	SS/MG Elective-II	3	0	
	<b>Total</b>	<b>12</b>	<b>3</b>	
<b>Semester-VIII</b>				
SE4092	Final Year Project-II	0	3	SE4091
CS3002	Information Security	3	0	
CS4001	Professional Practices	3	0	
SExxxx	SE Elective - V	3	0	
SExxxx	SE Elective - VI	3	0	
	<b>Total</b>	<b>12</b>	<b>3</b>	

## MS Admission Test, Eligibility and Selection Criteria

		Computing
<b>Degrees</b>		Master of Science (Artificial Intelligence) Master of Science (Cyber Security) Master of Science (Computer Science) Master of Science (Software Engineering)
<b>Admission Test</b>	Applicant must select <b>only one</b> out of the three admission test options	FAST-NUCES GRE General NTS GAT-A General
<b>Eligibility</b>	1 Degree earned in relevant subject of Science or Engineering from a recognized University after 16 years of education	Minimum 60% marks or CGPA of at least 2.00 on a scale of 4.00
<b>Selection Criteria</b>	1 Weightage of Admission Test marks	50%
	2 Weightage of past academic record (Bachelor)	50%

		Computing
<b>Degrees</b>		Master of Science (Data Science)
<b>Admission Test</b>	Applicant must select <b>only one</b> out of the three admission test options	FAST-NUCES GRE General NTS GAT-A General
<b>Eligibility</b>	1 Degree earned in relevant subject of Science, Mathematics or Engineering from a recognized University after 16 years of education	Minimum 60% marks or CGPA of at least 2.00 on a scale of 4.00
<b>Selection Criteria</b>	1 Weightage of Admission Test marks	50%
	2 Weightage of past academic record (Bachelor)	50%



# MS Admission Test, Eligibility and Selection Criteria

		Computing	
<b>Degrees</b>		Master of Science (Software Project Management)	
<b>Admission Test</b>	Applicant must select <b>only one</b> out of the three admission test options	FAST-NUCES GRE General NTS GAT-A General	
<b>Eligibility</b>	<p>1 Degree earned in relevant subject of Science or Engineering from a recognized University after 16 years of education</p> <p style="text-align: center;"><b>AND</b></p> <p>2 years of experience related to Software Development Lifecycle (SDLC) activities gained as a software engineer (or similar role e.g., quality assurance engineer, etc.) in a professional software development firm.</p>	Minimum 60% marks or CGPA of at least 2.00 on a scale of 4.00	
<b>Selection Criteria</b>	1	Weightage of Admission Test marks	50%
	2	Weightage of past academic record (Bachelor)	50%

**NOTE:** All documents/transcripts will be checked at the time of admission. Any incorrect/false information submitted by the applicant or any attempt to hide information will lead to disqualification of the candidate.



# Master of Science (Artificial Intelligence)

## Program Mission

To produce competent and well – round professionals capable of Applying Master of Science (Artificial Intelligence) and Data Science to solve real - life problems.

## Career Opportunities

The Master of Science (Artificial Intelligence) comprise of both course work as well as research component. There are three core courses aimed at strengthening the understanding and competence of students in Artificial Intelligence fundamentals. The university expects its Master of Science (Artificial Intelligence) graduates to pursue careers as AI experts in either academia or industry.

## Program Learning Outcomes

1. Create autonomous system/agents for solving complex real – world problems.
2. Apply the tools and techniques to make a strategically important impact on industry and society.
3. Pursue doctoral studies within the domain of Artificial Intelligence at top – ranked institutes of the world.
4. Take a leadership role in both AI academia and industry.
5. Students shell have the ability to make effective oral and written presentations on technical topics.

The following three courses or equivalent are prerequisites for starting Master of Science (Artificial Intelligence) coursework:

1. Object Oriented Programming
2. Data Structures and Algorithms
3. Artificial Intelligence

A student selected for admission may be asked to study these courses. The Admission Committee may assign up to four deficiency courses. These must be passed in the first two semester. Deficiency courses shall be determined by the Graduate studies Committee, before admitting the student. Fee is not charged for studying deficiency courses. A student may be allowed to take the Mathematical Foundation of AI course Along with the deficiency courses.

## Award of Degree

For the award of Master of Science (Artificial Intelligence) degree, a student must have

- Passed courses totaling at least 30 credit hours, including core courses
- Earned CGPA of at least 2.50

## Tentative Study Plan-Master of Science (Artificial Intelligence)

Code	Title	Cr.Hrs	
<b>Semester-I</b>			
AI5001	Advanced Artificial Intelligence	3	0
AI5002	Mathematical Foundation of Artificial Intelligence	3	0
CS4002	Applied Programming <sup>1</sup>	NC	
	General Elective (Computing/Management Sciences)	3	0
	<b>Total</b>	<b>9</b>	<b>0</b>
<b>Semester-II</b>			
AI5003	Advanced Machine Learning	3	0
CS5001	Research Methodology	3	0
	Computing Elective-I	3	0
	<b>Total</b>	<b>9</b>	<b>0</b>
<b>Semester-III</b>			
	Computing Elective-II	3	0
AI	MS Thesis-I/MS Project-I	0	3
	<b>Total</b>	<b>3</b>	<b>3</b>
<b>Semester-IV</b>			
	Computing Elective-III	3	0
AI	MS Thesis-II/MS Project-II	0	3
	<b>Total</b>	<b>3</b>	<b>3</b>
	<b>G. Total</b>	<b>30</b>	

**NOTE:** <sup>1</sup>Applied Programming is a NC course, which must be cleared during the first semester. The course may be exempted based on good performance in admission test.

Registration in 'MS Thesis-I/Project-I' shall be allowed provided the student has

- a. Earned at least 15 CH
- b. Passed the 'Research Methodology course' AND
- c. CGPA is equal to or more than 2.50



# Master of Science (Cyber Security)

## Program Mission

Mission of the Master of Science (Cyber Security) program is to develop knowledgeable professionals with the skills to detect, respond to and prevent cyber-attacks in organizations and protect national security. With a graduate degree in cyber security, you will build a comprehensive and strong foundation in the technical skills you need to keep your organization's computer systems, networks and data safe, secure and private. The program has been designed to prepare students with both theoretical and practical knowledge and enhance their research skills in these emerging areas.

## Career Opportunities

This program prepares students to meet challenges posed by a highly inter – connected world. Mobile Computing, Sensor Networks and other emerging technologies require a thorough understanding of related technologies. This program provides understanding and exposure to the latest trends and technologies in this field.

## Program Learning Outcomes

- To equip students so that they able to play an effective role in international efforts to make the cyberspace safe, secure and reliable for the national and international community.
- Prepare student to learn the technical aspects of information security by understanding current threats and vulnerabilities and examining ways of developing effective countermeasures.
- To produce skilled people who are able to contribute towards need of protecting national information infrastructure from all kinds of threats.
- Prepare students who can understand to implications of handling data in terms of data security.
- Students shell have the ability to make effective oral and Witten presentations on technical topics.

## Award of Degree

For the award of Master of Science (Cyber Security) degree, a student must have

- Passed courses totaling at least 30 credit hours, including core courses
- Earned CGPA of at least 2.50

## Tentative Study Plan-Master of Science (Cyber Security)

Code	Title	Cr.Hrs	
<b>Semester-I</b>			
CS 5001	Research Methodology	3	0
	Core Course-I	3	0
	Core Course-II	3	0
	Applied Programming <sup>1</sup>	NC	
	<b>Total</b>	<b>9</b>	<b>0</b>
<b>Semester-II</b>			
	Core Course-III	3	0
	Elective-I	3	0
	Elective-II	3	0
	<b>Total</b>	<b>9</b>	<b>0</b>
<b>Semester-III</b>			
	Elective-III	3	0
	MS Thesis-I/MS Project-I	0	3
	<b>Total</b>	<b>3</b>	<b>3</b>
<b>Semester-IV</b>			
	Elective-IV	3	0
	MS Thesis-II/MS Project-II	0	3
	<b>Total</b>	<b>3</b>	<b>3</b>
	<b>G. Total</b>	<b>30</b>	

**Note:** <sup>1</sup>Applied Programming is a NC course, which must be cleared during the first semester. The course may be exempted based on good performance in admission test.

Registration in 'Thesis-I/Project-I' shall be allowed provided the student has

- Earned at least 15 CH
- Passed the 'Research Methodology' course; AND
- CGPA is equal to or more than 2.50

## Core Courses

CY xxxx	Applied Information Security	
CY xxxx	Advanced Network Security	
CY xxxx	Secure Systems Design	
<b>Deficiency Courses:</b> For interdisciplinary admissions, following (undergraduate level) deficiency courses may be considered:		
	CY xxx Cyber Security	
	CY xxx Computer Networks	
	CS xxx Software Engineering	

# Master of Science (Computer Science)

## Program Mission

Master of Science (Computer Science) course work is tailored according to the international standards to nurture the capacity building and original thinking in our postgraduates for lifelong – learning. Our goal is to produce such postgraduates that they are highly sought after by a large number of national and international IT organizations and can pursue their further studies in national and international universities.

## Career Opportunities

1. To produce computer scientists who fulfil the requirements of the industry's software needs.
2. To fill the vacuum present, due to lack of computer science and technology education in the local region and beyond.
3. To provide a broad understanding of the computer science field by introducing innovative concepts, theories and techniques.
4. The sharpen communication skills in students and enable them to produce well – organized reports.
5. To provide formal foundations for further higher education.
6. To develop highly skilled researchers are scholar who may pursue in the field of computer sciences.

## Program Learning Outcomes

1. Students will possess advanced knowledge of the computer science field.
2. Students will be able to think creatively and critically; to solve non – trivial problems.
3. Students will be able to use computing knowledge to develop efficient solutions for real – life problems.
4. Students will be able to design solutions and can conduct research – related activities.

5. Students shall have ability to make effective oral and written presentations on technical topics.

The following core courses are recommended to be completed before entering the Master of Science (Computer Science) program.

1. Computer Programming
2. Data Structures
3. Operating Systems
4. Database Systems
5. Design and Analysis of Algorithms
6. Computer Networks
7. Theory of Automata
8. Software Engineering

A student selected for admission having deficiency in the above stated courses may be required to study a maximum of FOUR courses, which must be passed in the first two semesters. Deficiency courses shall be determined by the Graduate Studies Committee, before admitting the student. Fee is not charged for studying deficiency courses. A student May be allowed to take Research Methods and Applied Programming Course along with Deficiency Courses. If a student only has a deficiency in Theory of Automata, then the student cannot take theory of Programming Languages and Advanced Theory of Computation. Other courses in MS may be allowed to take. If a student has deficiency in Programming Fundamentals, Object Oriented Programming, and Algorithms, then it may be covered through the Applied Programming Course.

## Award of Degree

For the award of Master of Science (Computer Science) degree, a student must have

- Passed courses totaling at least 30 credit hours, including core courses
- Earned CGPA of at least 2.50

## Tentative Study Plan-Master of Science (Computer Science)

Code	Title	Cr.Hrs	
<b>Semester-I</b>			
CS4002	Applied Programming <sup>1</sup>	NC	
	Core Course-I	3	0
	Core Course-II	3	0
	Core Course-III	3	0
	<b>Total</b>	<b>9</b>	<b>0</b>
<b>Semester-II</b>			
CS5001	Research Methodology	3	0
	Computing Elective-I	3	0
	Computing Elective-II	3	0
	<b>Total</b>	<b>9</b>	<b>0</b>
<b>Semester-III</b>			
	Computing Elective-III	3	0
	MS Thesis-I/MS Project-I	0	3
	<b>Total</b>	<b>3</b>	<b>3</b>
<b>Semester-IV</b>			
	Computing Elective-IV	3	0
	MS Thesis-II/MS Project-II	0	3
	<b>Total</b>	<b>3</b>	<b>3</b>
	<b>G. Total</b>	<b>30</b>	

**NOTE:** <sup>1</sup>Applied Programming is a NC course, which must be cleared during the first semester. The course may be exempted based on good performance in admission test.

Registration in 'MS Thesis-I/Project-I' shall be allowed provided the student has

- a. Earned at least 15 CH
- b. Passed the 'Research Methodology course' AND
- c. CGPA is equal to or more than 2.50

## Core Courses for Master of Science (Computer Science)

CS5001	Advanced Analysis of Algorithms
CS5005	Advanced Operating System
CS5007	Advanced Theory of Computation
CS5006	Theory of Programming Languages

# Master of Science (Data Science)

## Program Mission

Master of Science (Data Science) course work is tailored according to the international standards to nurture the capacity building and original thinking in our postgraduates for lifelong – learning. Our goal is to produce such postgraduates that they are highly sought after by national and international organizations and can pursue their further studies in national and international universities.

## Career Opportunities

This program equips students to transform data in to actionable insights that enable one the make complex business decisions. Students will able to process large and complex data sets through computational, statistical, and machine learning techniques. This program will provide exposure to the latest trends and technologies in this field thus producing the man – power to fuel national and international emerging market of data science products.

1. To produce computer scientists who fulfil the requirements of the national and international market of data science products.
2. To equip students to transform data into actionable insights that enable them to make complex business decisions.
3. To enable students to apply computational. Statistical, and machine learning techniques to process large and complex data sets.
4. To enable students to conceive and execute data science projects.

## Program Learning Outcomes

The outcomes of the Master of Science (Data Science) program are:

1. To equip students to transform

data into actionable insights to make complex business decisions.

2. To enable students, understand and analyze a problem and arrive at computable solutions.
3. To expose students to the set of technologies that match those solutions.
4. To gain Hands – on experience on data- centric tools for statistical analysis. Visualizations. And big data applications at the same rigorous scale as in a practical data science project.
5. To understand the implications of handling data in terms of data security and business ethics.
6. Students shell have the ability to make effective oral and written presentations on technical topics.

The following two courses or equivalent are prerequisites for starting Master of Science (Data Science) coursework

1. Object Oriented Programming
2. Data Structures and Algorithms

A student selected for admission having deficiency in the above stated courses may be required to study them. However, these must be passed in the first two semesters. Deficiency courses shall be determined by the Graduate Studies Committee, before admitting the student. Fee is not charged for studying deficiency courses. A student may take the stat & Mathematical Data Science Course along with the deficiency courses.

## Award of Degree

For the award of Master of Science (Data Science) degree, a student must have

- Passed courses totaling at least 30 credit hours, including core courses
- Earned CGPA of at least 2.50

## Tentative Study Plan-Master of Science (Data Science)

Code	Title	Cr.Hrs	
<b>Semester-I</b>			
CS4002	Applied Programming <sup>1</sup>	NC	
DS5002	Data Science Tools and Techniques	3	0
DS5003	Statistics and Mathematics Methods for Data Science	3	0
	Specialized Core-I	3	0
	<b>Total</b>	<b>9</b>	<b>0</b>
<b>Semester-II</b>			
CS5001	Research Methodology	3	0
DS5004	Machine Learning for Data Science	3	0
	Specialized Core-II	3	0
	<b>Total</b>	<b>9</b>	<b>0</b>
<b>Semester-III</b>			
	Computing Elective-I	3	0
	MS Thesis-I/MS Project-I	0	3
	<b>Total</b>	<b>3</b>	<b>3</b>
<b>Semester-IV</b>			
	Computing Elective-II	3	0
	MS Thesis-II/MS Project-II	0	3
	<b>Total</b>	<b>3</b>	<b>3</b>
	<b>G. Total</b>	<b>30</b>	

**NOTE:** <sup>1</sup>Applied Programming is a NC course, which must be cleared during the first semester. The course may be exempted based on good performance in admission test.

Registration in 'MS Thesis-I/Project-I' shall be allowed provided the student has

1. Earned at least 15 CH
2. Passed the 'Research Methodology course' AND
3. CGPA is equal to or more than 2.50

## Specialized Core Courses (Choose 2)

DS 5001	Advance Big Data Analytics (3)
DS 5005	Distributed Data Processing (3)
DS 5006	Deep Learning (3)
DS 5007	Natural Language Processing (3)



# Master of Science (Software Engineering)

## Program Mission

The mission is to produce future software designers and innovators to shape the future of the nation through high-quality education, research, and technopreneurship. To provide students with state-of-the-art knowledge of the field and to develop their practical skills to meet current industrial requirements, as well as enhancing their ability to adapt to the new developments of tomorrow's technology.

## Career Opportunities

1. Prepare students who can critically apply concepts, theories, and practices to provide creative solutions to complex computing problems.
2. Prepare students to effectively communicate their ideas in written and electronic form and prepare them to work collaboratively in a team environment.
3. Prepare students with theoretical background of software engineering concepts, and train them on applied research of the field, needed to secure a doctorate position in the future
4. Prepare students to join a dynamic and divers career position in a computing-related field, and to maintain a growing career in a rapidly evolving field.
5. Prepare students to join a dynamic and diverse career position in a computing-related field, and to maintain a growing career in a rapidly evolving field.
6. Theories and practices to provide creative solutions to complex computing problems.
7. To respond to the current and emerging industrial needs utilizing modern trends for building complex software systems.

## Program Learning Outcomes

1. To have the ability to design system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
2. To understand the impact of engineering solution in a global, economic, environmental, and societal context.
3. To use the techniques, skills, and modern software engineering tools necessary for developing reliant software
4. To demonstrate an understanding of the apply current theories, models, and techniques that provide a basis for the software lifecycle
5. To communicate effectively with different audiences.
6. To change the world for the better through research and development in areas like healthcare, transportation, education, etc.

The following core courses are recommended to be completed before entering the Master of Science (Software Engineering) program.

1. Object Oriented Programming
2. Data Structures
3. Software Engineering
4. Software Design and Analysis
5. Software Quality Engineering

A student selected for admission having deficiency in the above stated courses may be required to study maximum of FOUR courses. These courses must be passed in the first two semester. Deficiency courses shall be determined by the Graduate studies Committee, before admitting the student. Fee is not charged for studying deficiency courses.

## Award of Degree

For the award of Master of Science (Software Engineering) degree, a student must have

- Passed courses totaling at least 30 credit hours, including core courses
- Earned CGPA of at least 2.50

## Tentative Study Plan-Master of Science (Software Engineering)

Code	Title	Cr.Hrs	
<b>Semester-I</b>			
CS4002	Applied Programming <sup>1</sup>	NC	
SE5001	Advance Software Requirement Engineering	3	0
SE5002	Advance Quality Assurance	3	0
	Computing Elective-I	3	0
	<b>Total</b>	<b>9</b>	<b>0</b>
<b>Semester-II</b>			
CS5001	Research Methodology	3	0
SE5003	Advance Software Architecture	3	0
	Computing Elective-II	3	0
	<b>Total</b>	<b>9</b>	<b>0</b>
<b>Semester-III</b>			
	Computing Elective-III	3	0
	MS Thesis-I/MS Project-I	0	3
	<b>Total</b>	<b>3</b>	<b>3</b>
<b>Semester-IV</b>			
	Computing Elective-IV	3	0
	MS Thesis-II/MS Project-II	0	3
	<b>Total</b>	<b>3</b>	<b>3</b>
	<b>G. Total</b>	<b>30</b>	

**NOTE:** <sup>1</sup>Applied Programming is a NC course, which must be cleared during the first semester. The course may be exempted based on good performance in admission test.

Registration in 'MS Thesis-I/Project-I' shall be allowed provided the student has

1. Earned at least 15 CH
2. Passed the 'Research Methodology course' AND
3. CGPA is equal to or more than 2.50

# Master of Science (Software Project Management)

## Program Mission

To develop student's skills necessary to manage Master of Science (Software Projects Management) coupling both with its theoretical and practical aspects that, strengthens them to acquire leadership poisons in the software industry whereby they can become agents of change and improvement.

## Career Opportunities

1. To prepare the students to assess and manage risks by developing strategies they handle them.
2. To enable students to gather and manage requirements, and provide effective coordination between relevant stakeholders.
3. To help students in identifying, documenting and analyzing change managements to agreeing on changes to scope.
4. To prepare students for configuration management of large scale software.
5. To enable students in identifying, prioritizing and agreeing on software releases by preparing release schedules by estimating software costs and resource requirements.
6. To acquire students with the ability to identify and resolve conflicts that may arise during the management of software projects.
7. Inculcate a sense of ethics, responsibilities and leadership.

## Program Learning Outcomes

1. Students will be able to exhibit expertise in managing large scale projects as their final year project or conduct research related to Software project management.
2. Students will demonstrate analytical and communication skill while exhaling project resource forecasting abilities and quality implementing for successful completion of the project.
3. Students will develop skills to

understand and implement industry adopted standards and calculate and examine project and process metrics.

4. Demonstrate effective organizational leadership skill concerning project teams and stakeholders.

## Award of Degree

For the award of Master of Science (Software Project Management) degree, a student must have

- Passed courses totaling at least 30 credit hours, including core courses
- Earned CGPA of at least 2.50



## Tentative Study Plan-Master of Science (Software Project Management)

Code	Title	Cr.Hrs	
<b>Semester-I</b>			
CS5001	Research Methodology	3	0
CS5015	Software Project Management	3	0
MG4006	Management and Organizational Behavior	3	0
	<b>Total</b>	<b>9</b>	<b>0</b>
<b>Semester-II</b>			
CS5002	Software Quality Assurance	3	0
CS5003	Software Process Management and Metrics	3	0
CS5004	Requirements Engineering	3	0
	<b>Total</b>	<b>9</b>	<b>0</b>
<b>Semester-III</b>			
	Computing Elective	3	0
	MS Thesis-I/MS Project-I/Practicum-I	0	3
	<b>Total</b>	<b>3</b>	<b>3</b>
<b>Semester-IV</b>			
	General Elective-I (Computing/Management Sciences)	3	0
	MS Thesis-II/MS Project-II/Practicum-II	0	3
	<b>Total</b>	<b>3</b>	<b>3</b>
	<b>G. Total</b>	<b>30</b>	

Registration in 'MS Thesis-I/Project-I/Practicum-I' shall be allowed provided the student has

- Earned at least 15 CH
- Passed the 'Research Methodology course' AND
- CGPA is equal to or more than 2.50