Master of Science (MS) Computer Science

√	Course Title	CrHr	Pre-Req	Code	Course Title	CrHr	Pre-Req
Year 1 Semester I				**Year 1 Semester II**			
CS515	Theory of Computations	3(3+0)	None	CS516	Advance Analysis of Algorithms	3(3+0)	--
CS517	Advanced Operating Systems	3(3+0)	None	CS531	Advanced Computer Architecture	3(3+0)	--
CS***	CS Elective – I	3(3+0)	None	CS***	CS Elective – II	3(3+0)	--
Year 2 Semester III				**Year 2 Semester IV**			
CS***	CS Elective – III	3(3+0)	--				
CS***	CS Elective – IV	3(3+0)	--	CS699	MS Research	-	6(0+6)
CS699	MS Research	6(0+6)	--	Contd:			

Core Courses (12 CrHr):

The following courses are the core courses which are compulsory for every student to registered in MSCS degree program. Students are required to study all these courses.

Code	Title	Pre-Requisite	CrHr
CS515	Theory of Computations	None	3(3+0)
CS516	Advanced Analysis of Algorithms	None	3(3+0)
CS517	Advanced Operating Systems	None	3(3+0)
CS531	Advanced Computer Architecture	None	3(3+0)

Elective (Student will be required to take – 4 courses) 12 CrHr

Code	Title	Pre-Requisite	CrHr
CS505	Research Methods with an IT Perspective	None	3(3+0)
CS611	Advance Parallel Programming	None	3(3+0)
CS612	Advance Distributed Systems	None	3(3+0)
CS613	Analysis and Design of Parallel Algorithms	None	3(3+0)
CS614	Algorithms for Bio-Informatics	None	3(3+0)
CS622	Advance Data Mining	None	3(3+0)
CS623	Big Data	None	3(3+0)
CS541	Multimedia Computing and Applications	None	3(3+0)
CS542	Computer Vision	None	3(3+0)
CS643	Semantic Web	None	3(3+0)

CS644	Data Compression	None	3(3+0)
CS645	Web Metrics	None	3(3+0)
CS646	Web Usability	None	3(3+0)
CS554	Requirement Engineering	None	3(3+0)
CS555	Software System Architecture	None	3(3+0)
CS556	Advance Software Quality Assurance	None	3(3+0)
CS657	Advance Software Project Management	None	3(3+0)
CS658	Software Testing	None	3(3+0)
CS563	Soft Computing	None	3(3+0)
CS564	Evolutionary Computing	None	3(3+0)
CS565	Advance Natural Language Engineering	None	3(3+0)
CS566	Design and Development of Corpora	None	3(3+0)
CS567	Information Architecture for the World Wide Web	None	3(3+0)
CS568	Advance Human Computer Interaction	None	3(3+0)
CS569	Information Authoring	None	3(3+0)
CS661	Advance Machine Learning	None	3(3+0)
CS662	Advance Artificial Neural Networks	None	3(3+0)
CS665	Development of Natural Language Engineering Resources	None	3(3+0)
CS666	Optimized Input Methods	None	3(3+0)
CS667	Machine Translation	None	3(3+0)
CS668	Advance Information Retrieval	None	3(3+0)
CS571	Advance Computer Communication & Networks	None	3(3+0)
CS576	Advance Network Security	None	3(3+0)
CS573	Wireless and Mobile Networks	None	3(3+0)
CS673	Advance Network Programming	None	3(3+0)
CS676	Network Management	None	3(3+0)
CS677	Advance Information Security	None	3(3+0)
CS678	Networks Middle Ware Design	None	3(3+0)

Thesis/Research: (6 CrHr)

Code	Title	Pre-Req	Cr Hrs
CS699	MS Research Report	None	6(0+6)

Master of Science in Data Science (MSDS)

MSDS (Semester Plan)

The MSDS degree programme is divided into four semesters as follows.

Code	Course Title	CrHr	Pre-Req	Code	Course Title	CrHr	Pre-Req
Year 1 Semester I				**Year 1 Semester II**			
DS501	Tools and Techniques for Data Science	3(3+0)	None	CS661	Advance Machine Learning	3(3+0)	None
DS502	Statistical and Mathematical Methods for Data Analysis	3(3+0)	3(3+0)	DS***	DS Elective – II	3(3+0)	None
DS***	DS Elective – I	3(3+0)	3(3+0)	DS***	DS Elective – III	3(3+0)	None
Year 2 Semester III				**Year 2 Semester IV**			
CS***	CS Elective – III	3(3+0)	--	DS699	MS Research	-	6(0+6)
CS***	CS Elective – IV	3(3+0)	--	Contd:			
DS699	MS Research	6(0+6)	--				

Core Courses (09 CrHr):
The following courses are the core courses which are compulsory for every student to registered in MSDS degree programme. Students are required to study all these courses.

Code	Title	Pre-Requisite	CrHr
DS501	Tools and Techniques for Data Science	None	3(3+0)
DS502	Statistical and Mathematical Methods for Data Analysis	None	3(3+0)
CS661	Advance Machine Learning	None	3(3+0)

Specialization Core Courses (06 CrHr):
The following courses are the Specialized core courses. Students are required to choose any two to register in MSDS degree program.

Code	Title	Pre-Requisite	CrHr
DS521	Big Data Analytics	None	3(3+0)
DS505	Deep Learning	None	3(3+0)
CS565	Advance Natural Language Engineering	None	3(3+0)
DS513	Distributed Data Processing and Machine Learning		

Elective (Student will be required to take – 3 courses) 9 CrHr
(Not limited to the list below, Institutions may add more courses)

Code	Title	Pre-Requisite	CrHr
CS542	Computer Vision	None	3(3+0)
CS614	Algorithms for Bio-Informatics	None	3(3+0)
DS503	Bayesian Data Analysis	None	3(3+0)
DS504	Data Visualization	None	3(3+0)
DS506	Optimization Methods for Data Science and Machine Learning	None	3(3+0)
DS604	Deep Reinforcement Learning	None	3(3+0)
DS602	Probabilistic Graphical Models	None	3(3+0)
DS603	Social network analysis	None	3(3+0)
DS604	Time series Analysis and Prediction	None	3(3+0)
DS511	Algorithmic trading	None	3(3+0)
DS512	Cloud computing	None	3(3+0)
DS611	Distributed Machine Learning in Apache Spark	None	3(3+0)
DS612	High performance computing	None	3(3+0)
DS522	Computational Genomics	None	3(3+0)
DS621	Inference & Representation	None	3(3+0)
DS622	Scientific Computing in Finance	None	3(3+0)

Thesis/Research: (6 CrHr)

Code	Title	Pre-Requisite	CrHr
DS699	MS Research Report	None	6(0+6)

Master of Science in Software Engineering   MSSE

MSSE (Semester Plan)

The MSSE degree programme is divided into four semesters as follows.

Code	Course Title	CrHr	Pre-Req	Code	Course Title	CrHr	Pre-Req
Year 1 Semester I				**Year 1 Semester II**			
SE501	Advanced Requirements Engineering	3(3+0)	None	SE541	Software Testing and Quality Assurance	3(3+0)	--
SE511	Advanced Software System Architecture	3(3+0)	None	SE***	Domain Elective – II	3(3+0)	--
SE***	Domain Elective – I	3(3+0)	None	SE***	General Elective – I	3(3+0)	--

Year 2 Semester III				Year 2 Semester IV			
CS***	CS Elective – II	3(3+0)	--				
CS***	CS Elective – III	3(3+0)	--	SE699	MS Research	-	6(0+6)
SE699	MS Research	6(0+6)	--	Contd:			

Core Courses (09 CrHr):
The following courses are the core courses which are compulsory for every student to registered in MSSE degree programme. Students are required to study all these courses.

Code	Title	Pre-Requisite	CrHr
SE501	Advanced Requirements Engineering	SE501	3(3+0)
SE511	Advanced Software System Architecture	SE511	3(3+0)
SE541	Software Testing and Quality Assurance	SE541	3(3+0)

Domain Specific Technical Elective Courses (Student will be required to take –2 courses) 06 CrHr

Code	Title	Pre-Requisite	CrHr
SE512	Software Measurement and Metrics	None	3(3+0)
SE631	Component Based Software Engineering	None	3(3+0)
SE513	Advanced Formal Methods	None	3(3+0)
CS568	Advance Human Computer Interaction	None	3(3+0)
SE514	Agile Software Development Methods	None	3(3+0)
SE515	Empirical Software Engineering	None	3(3+0)
SE521	Advanced Software Project Management	None	3(3+0)

General Technical Elective Courses (Student will be required to take –3 courses) 09 CrHr
(Not limited to the list below, Institutions may add more courses)

Code	Title	Pre-Requisite	CrHr
SE621	Software Risk Management	None	3(3+0)
CS601	Research Methodology	None	3(3+0)
SE622	Software Configuration Management	None	3(3+0)
SE641	Reliability Engineering	None	3(3+0)
SE632	Complex Networks	None	3(3+0)
SE611	Agent Based Modeling	None	3(3+0)

Thesis/Research: (6 CrHr)

Code	Title	Pre-Requisite	CrHr
SE699	MS Research Report	None	6(0+6)

PhD Computer Science programme

PhD Computer Science (Semester Plan)

The PhD degree programme is divided into six semesters as follows.

Code	Course Title	CrHr	Pre-Req	Code	Course Title	CrHr	Pre-Req
Year 1 Semester I				**Year 1 Semester II**			
CS***	CS Elective – I	3(3+0)	None	CS***	CS Elective – III	3(3+0)	None
CS***	CS Elective – II	3(3+0)	None	CS***	CS Elective – IV	3(3+0)	None
XXX***	Non Credit Course - I	0(3+0)	None	XXX***	Non Credit Course - II	0(3+0)	None
Year 2 Semester III				**Year 2 Semester IV**			
CS***	CS Elective – V	3(3+0)	None	CS991	Thesis	6(0+6)	None
CS***	CS Elective – VI	3(3+0)	None				
				Comprehensive Examination			
Year 3 Semester V				**Year 3 Semester VI**			
CS999	Thesis	6(0+6)	None	CS999 Continued	Thesis	6(0+6)	None

Elective (Student will be required to take – 6 courses) 18 CrHr

Code	Title	Pre-Requisite	CrHr
CS711	Cluster and Grid Computing	None	3(3+0)
CS712	High Performance Computing	None	3(3+0)
CS741	Advance Topics in Semantic Web	None	3(3+0)
CS764	User Interface Design in Global Perspectives	None	3(3+0)
CS766	Knowledge Representation	None	3(3+0)
CS767	Computational Linguistics	None	3(3+0)
CS768	Statistical Natural Language Engineering	None	3(3+0)
CS769	Knowledge Based System Design	None	3(3+0)
CS765	Parsing Technologies	None	3(3+0)
CS862	Information Foraging	None	3(3+0)
CS863	Recommender Systems	None	3(3+0)
CS866	Computational Intelligence	None	3(3+0)
CS867	Speech Processing Techniques	None	3(3+0)
CS868	Advance Information Retrieval	None	3(3+0)
CS771	Mobile Adhoc Networks	None	3(3+0)
CS772	Wireless Mesh Networks	None	3(3+0)
CS776	Wireless Sensor Networks	None	3(3+0)
CS777	Advance Networking	None	3(3+0)
CS778	Advance Wireless Network Security	None	3(3+0)
CS779	Advance Wireless Networks	None	3(3+0)

CS875	Mobile Communication Systems	None	3(3+0)
CS876	Information and Coding Theory	None	3(3+0)
CS877	Traffic Control and Quality of Services	None	3(3+0)

Thesis/Research: (6 CrHr)

Code	Title	Pre-Requisite	CrHr
CS999	Thesis	None	6(0+6)