

FIRST YEAR (FRESHMAN)													
Course Code		Title		LC	LB	CR	Course Code		Title		LC	LB	CR
MATH	101	Calculus I		4	0	4	MATH	102	Calculus II		4	0	4
XX	xxx	Science Elective *		-	-	3	ENGL	102	Introduction to Report Writing		3	0	3
ENGL	101	An introduction to Academic Discourse		3	0	3	DSC	102	Programming (Python) I		2	3	3
PHYS	101	General Physics I		3	3	4	IAS	101	Practical Grammar		2	0	2
IAS	111	Belief and its Consequences		2	0	2	PE	102	Health and Physical Education II		0	2	1
PE	101	Health and Physical Education I		0	2	1	DSC	200	Data Science I		2	3	3
				12	5	17					13	8	16
SECOND YEAR (SOPHOMORE)													
Course Code		Title		LC	LB	CR	Course Code		Title		LC	LB	CR
STAT	201	Introduction to Statistics		2	2	3	SWE	205	Introduction to SWE		3	0	3
DSC	201	Programming (Python) II		3	3	4	DSC	290	Computational Linear Algebra		3	0	3
DSC	211	Applied Data Science		2	3	3	DSC	213	Discrete Structures I		3	0	3
IAS	212	Professional Ethics		2	0	2	DSC	212	Introduction to Data Structures		3	0	3
ENGL	214	Acad. & Prof. Communication		3	0	3	DSC	233	Data Management and Analysis		2	3	3
CSE	309	Professionalism and Ethics		1	0	1							
				13	8	16					14	3	15
THIRD YEAR (JUNIOR)													
Course Code		Title		LC	LB	CR	Course Code		Title		LC	LB	CR
CYB	301	Data Security and Privacy		3	0	3	STAT	319	Prob. & Statistics for Engineers		2	3	3
DSC	307	Data Science in Research, Business and Society		3	0	3	CSE	353	Design and Analysis of Algorithms		3	0	3
CSE	324	Database Systems		3	3	4	DSC	355	Internet Programming		2	3	3
IAS	201	Writing for Professional Needs		2	0	2	DSC	385	Data Visualization		2	3	3
DSC	300	Data Science II		2	3	3	IAS	301	Oral Communication Skills		2	0	2
XX	XXX	Free Elective I		3	0	3	CSE	343	Fund. of Computer Networks		3	3	4
				16	6	18					14	12	18
Summer Session							DSC	399	Summer Training		0	0	0
FOURTH YEAR (SENIOR)													
Course Code		Title		LC	LB	CR	Course Code		Title		LC	LB	CR
GS	XXX	GS Elective		3	0	3	DSC	429	Project Implementation		0	6	2
IAS	322	Human Rights in Islam		2	0	2	CSE	401	Operating Systems		3	3	4
DSC	423	Data Warehousing and Mining		2	3	3	CSE	485	Machine Learning		2	3	3
DSC	485	Introduction to Data Analytics		2	3	3	XXX	XXX	Major Elective I		3	0	3
DSC	473	Programming for Big Data		2	3	3	XXX	XXX	Major Elective II		3	0	3
DSC	419	Project Proposal		1	0	1							
				12	9	15					11	12	15
TOTAL CREDITS: 130													

Science Elective* minimum of 3 credit hours (either BIOL 233 or CHEM 101 etc.)



COURSE DESCRIPTION

DSC 102 Programming (Python) I

(2-3-3)

Overview of computers and computing. Introduction to a programming language. Basic data types and operators. Variables and types, Functions, basic recursion, Control flow: Branching and repetition; Introduction to objects: Strings and lists; Introduction to data structures: Dictionaries, Functions as a type, anonymous functions and list comprehensions

Co-requisite: MATH 101

DSC 201 Python Programming (Python) II

(3-3-4)

Advanced programming in Python; Functions, Object oriented programming in Python, Python standard libraries, files, GUI; Third party tools, list, tuples, searching and sorting.

Pre-requisite: DSC 102

DSC 200 Data Science I

(2-3-3)

Foundation of Data Science. Introduction of students to data science tools like R, MsExcel, Jupyter notebooks, used by Data Scientists. Methodologies in tackling data science problems. Relational database concepts and the use of SQL to query databases. Students will complete hands-on labs and projects using R to apply data science acquired skills.

Pre-requisite: none

DSC 211 Applied Data Science

(2-3-3)

Python programming; data visualization and data analysis. Through guided lectures, labs, and projects, students will get hands-on experience tackling interesting data problems. Python and data science skills applied into big data, AI, and deep learning. Case studies in applied areas such as healthcare, transportation, smart cities etc

Pre-requisite: DSC 200

DSC 233 Data Management and Analysis

(2-3-3)

Introduction to Data Management and Data Analysis. Data Life Cycle (propose, collect, assure, describe, submit, preserve, discover, integrate, analyse, publish)

Pre-requisite: none



DSC 307 Data Science in Research, Business and Society

(3-0-3)

The objective is to introduce students to the importance and societal impact of data science in various sectors of human endeavour.

Pre-requisite: none

DCS 385 Data Visualization

(2-3-3)

Introduction; Color and Perception; Visual Design Principles; Visual Design Tasks and Rules; Visual Analytics of Trajectories; Visual Analytics of Multi-Dimensional Data; Text Data Visualization; Graph Visualization; Narrative Visualization; Volume Rendering; Flow Visualization

Pre-requisite: DSC 200

DSC 485 Introduction to Data Analytics

(2-3-3)

This course is to introduce students to different ways to analyze data. Data Visualizing; Exploring; Summarizing; Distributions ; Inference; Predicting; Smoothing; Time Series; Comparing; Grouping; Reducing; Learning Anomalies and Analyzing.

Pre-requisite: DSC 200

DSC 423 DataWarehousing and Mining

(2-3-3)

Knowledge discovery process and the use of data mining concepts and tools as part of that process; Introduction to data mining tools. In depth analysis of processes for automatically extracting valid, useful, and previously unknown information from data sources and using the information to make decisions. Fundamentals of building and populating a data mart to support the planning, designing and building of business intelligence applications and data analytics.

Pre-requisite: CSE 324

DSC 473 Programming for Big Data

(2-3-3)

This course provides a broad and practical introduction to big data: data analysis techniques including databases, data mining, and machine learning; Introduction of students to big data tools such as Spark and Hadoop. pitfalls in data collection and analysis; historical context, privacy, and other ethical issues. Tools and techniques are hands-on but at a cursory level, providing a basis for future exploration and application.

Pre-requisite: DSC 102, DSC 201



DSC 212 Introduction to Data Structures

(3-0-3)

Fundamental programming with supporting theoretical foundations and practical applications. Practical application of techniques for writing and analyzing programs: data abstraction, program verification, and performance analysis. Introduction to RDDs (Resilient Distributed Datasets)

Prerequisite: DSC 102

DSC 213 Discrete Structures I

(3-0-3)

Propositional Logic, Predicate Logic, Sets, Functions, Sequences and Summation, Proof Techniques, Mathematical induction, Inclusion-exclusion and Pigeonhole principles, Permutations and Combinations (with and without repetitions), The Binomial Theorem, Recurrence Relations; Graphs terminology and applications, Connectivity, Isomorphism, Euler and Hamilton Paths and Circuits, Planarity and Coloring; Trees terminology and applications.

Prerequisite: DSC 102

Equivalent to CSE 253

DSC 355 Internet Programming

(2-3-3)

Web Engineering fundamentals: requirements, analysis modeling, design modeling, testing. Internet basic for web applications. Technologies and tools for developing web applications: markup languages, styling, data description and transformation, client and server side programming. Web services. Advances in web engineering.

Prerequisites: Junior Standing

Equivalent to SWE 363

DSC 290 Computational Linear Algebra

(3-0-3)

Course Description: Linear equations, matrices, and determinants; vector spaces and linear transformations; inner products and eigenvalues. This course emphasizes computational aspects of Linear Algebra.

Prerequisite: Math 102

Equivalent to Math 280

DSC 300 Data Science II

(2-3-3)

Course Description: This course introduces advanced concepts, methodologies and techniques in relation to data science including novel learning approaches, deep learning, reinforcement learning, novel data mining methodologies and emerging modes of data acquisition and aggregation. The course will develop students' understanding of data mining concepts and their ability to carry out advanced data science projects.

Prerequisite: DSC 200



DSC 399 Summer Training

(0-0-0)

A summer period of 8 weeks spent as a trainee in industry, business, or government agencies for the purpose of familiarizing the student with the real job world and enabling him/her to apply and relate her/his academic knowledge to a real work environment. The students are required to participate in computer science related activities and use their time to be acquainted with the computer science related functions and resources used by their employing organization. Besides progress reports, the student is required to submit a final report and give a presentation on his/her experience and the knowledge he/she gained during his/her summer training program. The student receives a zero-credit Pass/Fail grade.

Prerequisites: SWE 363, ENGL 214, and Department Approval

DSC 419 Project proposal

(1-0-1)

Project proposal course offers students an opportunity to acquire knowledge and design proposal for final year project. This would require them to gather information about the subject and develop a project proposal. At this stage, students must carry on initial phases of system development under the supervision of a supervisor (as possible). At the end of the semester, students are asked to make an oral presentation with the presence of faculty members as referees.

Prerequisite: SWE 205 and CSE 324

DSC 429 Project Implementation

(0-6-2)

Project implementation course offers students an opportunity to assemble their knowledge acquired throughout their BS curriculum to complete project. This would require them to build on the proposed subject and implement a system. At this stage, students must carry on all phases of system development for the subject already defined in the precedent course (Project proposal), and under the supervision of the same supervisor (as possible). At the end of the semester, students are asked to make an oral presentation with the presence of faculty members as referees.

Prerequisite: SWE 205 and CSE 324

DSC 490 Special Topics I

(3-0-3)

State-of-the-art topics in Data Science

Prerequisite: Department approval.

DSC 491 Special Topics II

(3-0-3)

State-of-the-art topics in Data Science

Prerequisite: Department approval

