NOIDA INTERNATIONAL UNIVERSITY

SCHOOL OF ENGINEERING & TECHNOLOGY

EVALUATION SCHEME & SYLLABUS

FOR

BACHELOR OF TECHNOLOGY

Computer Science with Minor Specialization in Data Science

B. Tech (CSE - Data Science)

(4 Year Course)

W.E.F Session 2022-2023 onwards

About the Programme

B. Tech in Computer Science (Data Science) is an undergraduate programme with advanced learning solutions imparting knowledge of advanced innovations like Data Science, often called deep learning and artificial intelligence.

This specialization is designed to enable students to build intelligent machines, software, or applications with a cutting-edge combination of machine learning, analytics and visualization technologies. The main goal of Data Science (DS) is to program computers to use example data or experience to solve a given problem. Many successful applications based on Data Science exist already, including systems that analyze past sales data to predict customer behaviour (financial management), recognize faces or spoken speech, optimize robot behaviour so that a task can be completed using minimum resources, and extract knowledge from bioinformatics data.

This programme discusses Data Science methods based in different fields, including neural networks, signal processing, control, and data mining, in order to present a unified treatment of Data Science problems and solutions.

Programme Educational Objectives (PEO)

Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

The Program Educational Objectives (PEOs) of UG Program in Computer Science & Engineering are:

The Department of Computer Science & Engineering& Information Technology has developed and maintained a well-defined set of educational objectives and desired program outcomes. Educational objectives of the program cater to the requirements of the stakeholders such as students, parents, employers, alumni, faculty etc. The program educational objectives are as follows:

- **PEO**1: Provide graduates with a strong foundation in mathematics, science and engineering fundamentals to enable them to devise and deliver efficient solutions to challenging problems in Electronics, Communications and allied disciplines.

- **PEO**2: Impart analytic and thinking skills to develop initiatives and innovative ideas for R&D, Industry and societal requirements.

- **PEO**3: Provide sound theoretical and practical knowledge of CS/IT Engineering, managerial and entrepreneurial skills to enable students to contribute to the well-being of society with a global outlook.

- **PEO**4: Inculcate qualities of teamwork as well as social, interpersonal and leadership skills and an ability to adapt to evolving professional environments in the domains of engineering and technology.

- **PEO**5: Motivate graduates to become good human beings and responsible citizens for the overall welfare of the society.

Methods of Forming PEO's

- **STEP 1.** The needs of the Nation and society are identified through scientific publications industry interaction and media.
- **STEP 2.** Taking the above into consideration, the PEOs are established by the Coordination Committee of the department.
- **STEP 3.** The PEOs are communicated to the alumni and their suggestions are obtained.
- **STEP 4.** The PEOs are communicated to all the faculty members of the department and their feedback is obtained.
- **STEP 5.** The PEOs are then put to the Board of Studies of the department for final approval.

Program Outcomes (PO's)

- **PO1:Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO2: Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics natural sciences, and engineering sciences.
- **PO3: Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO4: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO5: Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO6: The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO7: Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **PO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO9: Individual and teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

- **PO11: Project management and finance:** Demonstrate knowledge and understanding of u, engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **PO12: Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Fee Structure:

For National Students

Yearly Fee

1st Year	**2nd Year** 189901	**3rd Year**195600	**4th Year** 201468
1,25,000	**1,25,000**	**1,35,000**	**1,35,000**

For International Students

Fee Per Semester	**Fee Per Year**		
75,000	1,50,000		

This course is for individuals who...

This programme is for students who want to acquire the ability to design intelligent solutions to problems in a variety of domains and business applications and fields such as natural language processing, text mining, robotics, reasoning and problem-solving

Students who are looking for...

a career with exceptional prospective fields and challenging roles in a futuristic industry. The financial security, the freedom to relocate, lifelong prospects of learning makes this programme an ideal career for computer science enthusiasts.

Minimum Eligibility:

National Students	• Matriculation with-60% marks Sr. Secondary (10+2) 70% marks (Aggregate) & minimum 60% marks in PCM Computer Science/PCB for Biotechnology without gap between 10th and 12th. Minimum 50% marks in Maths • NIUAT (Online Test) Followed by Personal Interview Or • JEE All India Rank upto 3 Lakh Or • UPSEE All India Rank upto 50 000
Inter-National Students	The eligibility criterion for all programs for international applicants is minimum 50% in the qualifying examination and having studied the pre-requisite subjects

First Semester

S.No	Course Code	Subject	Period			Evaluation Scheme					
						Internal Assessment			External Assessment	Total	Total Credits
			L	T	P	CA	TA	Total			
1	BSC 103	Mathematics –I	3	1	0	20	20	40	60	100	4
2	BSC102	Chemistry-I	3	1	0	20	20	40	60	100	4
3	HSMC 101	English	2	0	0	20	20	40	60	100	2
4	ESC103	Programming for Problem Solving	3	0	0	20	20	40	60	100	3
5	ESC102	Engineering Graphics & Design	1	0	0	20	20	40	60	100	1
		Induction Program	-	-	-	-	-	-	-		0
		PRACTICALS									
1	BSC 102P	Chemistry-I Lab	0	0	3	-	-	40	60	100	1.5
2	ESC103P	Programming for Problem Solving Lab	0	0	4	-	-	40	60	100	2
3	ESC102P	Engineering graphics & Design Lab	0	0	4	-	-	40	60	100	2
4	HSMC101P	English Lab	0	0	2	-	-	40	60	100	1
Total											20.5

SECOND SEMESTER

S.No	Course Code	Subject	Period			Evaluation Scheme					
						Internal Assessment			External Assessment	Total	Total Credits
			L	T	P	CA	TA	Total			
1	BSC101	Physics	3	1	0	20	20	40	60	100	4
2	BSC 104	Mathematics –II	3	1	0	20	20	40	60	100	4
3	ESC104	Workshop/Manufacturing Practices	1	0	0	20	20	40	60	100	1
4	ESC101	Basic Electrical Engineering	3	1	0	20	20	40	60	100	4
5	AECC01	Environmental Studies	2	0	0	20	20	40	60	100	0
		PRACTICALS									
1	BSC101P	Physics Lab	0	0	3	-	-	40	60	100	1.5
2	ESC102P	Workshop/Manufacturing Practices	0	0	4	-	-	40	60	100	2
3	ESC101P	Basic Electrical Engineering Lab	0	0	2	-	-	40	60	100	1

THIRD SEMESTER

COURSE		Contact Hours/Week			Credit	Evaluation Scheme				
Code	Course Title	L	T	P		CA	TA	Int. Total	Ext.	Total
BSC301	Discrete Mathematics	3	0	0	2	20	20	40	60	100
ESC301	Analog Electronic Circuits	3	0	0	3	20	20	40	60	100
ESC302	Digital Electronics	3	0	0	3	20	20	40	60	100
PCC-CS301	Data Structure & Algorithms	3	0	0	3	20	20	40	60	100
PCC-CS302	IT Workshop	1	0	0	1	20	20	40	60	100
HSMC301	Humanities –I (Human psychology)	3	0	0	3	20	20	40	60	100
BTDS01	Introduction to Python	3	0	0	3	20	20	40	60	100
PRACTICALS										
ESC301P	Analog Electronic Circuits Lab	0	0	4	2	20	20	40	60	100
ESC302P	Digital Electronics Lab	0	0	4	2	20	20	40	60	100
PCC-CS301P	Data Structure & Algorithms Lab	0	0	4	2	20	20	40	60	100
PCC-CS302 P	IT Workshop (MATLAB) Lab	0	0	4	2	20	20	40	60	100
BTDS01P	Introduction to Python	0	0	2	2	20	20	40	60	100
Total		**19**	**0**	**18**	**28**					

FOURTH SEMESTER

PCC-CS401	Computer Based Numerical & Statistical Techniques	3	0	0	3	20	20	40	60	100
PCC-CS402	Computer Organization & Architecture	3	0	0	3	20	20	40	60	100
PCC-CS403	Operating Systems	3	0	0	3	20	20	40	60	100
PCC-CS404	Design &Analysis of Algorithms	3	0	0	3	20	20	40	60	100
HSMC-401	Humanities –II (Human Values)	3	0	0	3	20	20	40	60	100
BSC-401	Biology	2	1	0	3	20	20	40	60	100
BTDS02	Probability & Statistics	4	0	0	4	20	20	40	60	100
PRACTICALS										
PCC-CS402P	Computer Organization & Architecture Lab	0	0	4	2	20	20	40	60	100
PCC-CS403P	Operating Systems Lab	0	0	4	2	20	20	40	60	100
PCC-CS404P	Design &Analysis of Algorithms Lab	0	0	4	2	20	20	40	60	100
Total		**21**	**1**	**12**	**28**					

FIFTH SEMESTER

COURSE		Contact Hours/Week			Credit	% of Total Marks				
Code	Course Title	L	T	P		CA	TA	Int. Total	Ext.	Total
ESC-501	Signal &Systems	3	0	0	3	20	20	40	60	100
PCC-CS501	Database Management Systems	3	0	0	3	20	20	40	60	100
PCC-CS502	Formal Language & Automata Theory	3	0	0	3	20	20	40	60	100
PCC-CS503	Object Oriented Programming	2	0	0	2	20	20	40	60	100
	Elective I	3	0	0	3	20	20	40	60	100
HSMC501	Management I(OB/F&A*)	3	0	0	3	20	20	40	60	100
BTDS03	Statistical Method – I	4	0	0	4	20	20	40	60	100
PRACTICALS										
PCC-CS501P	Database Management Systems Lab	0	0	4	2	20	20	40	60	100
PCC-CS503P	Object Oriented Programming Lab	0	0	4	2	20	20	40	60	100
PROJ-CS50	Industrial Seminar**	0	0	6	3	20	20	40	60	100
Total		**17**	**0**	**14**	**24**					
SIXTH SEMESTER										
PCC-CS601	Compiler Design	3	0	0	3	20	20	40	60	100
PCC-CS602	Computer Networks	3	0	0	3	20	20	40	60	100
	Elective II	3	0	0	3	20	20	40	60	100
	Elective III	3	0	0	3	20	20	40	60	100
OEC001	Soft Skills & interpersonal Communication	3	0	0	3	20	20	40	60	100
MC601	Constitution of India/Essence of Indian traditional knowledge	0	0	0	0	20	20	40	60	100
BTDS04	Deep Learning	4	0	0	4	20	20	40	60	100
BTDS05	Predictive Modeling	4	0	0	4	20	20	40	60	100
PRACTICALS										
PCC-CS601P	Compiler Design	0	0	4	2	20	20	40	60	100
PCC-CS602P	Computer Networks	0	0	4	2	20	20	40	60	100
PROJ-CS60	Project –I**	0	0	6	3	20	20	40	60	100
	Total	**23**	**0**	**14**	**30**					

***OB/F&A- Organizational Behavior/ Finance & Accounting**

****The marks will be awarded on the basis of 06 weeks industrial training conducted after 4th semester**

SEVENTH SEMESTER

COURSE		Contact Hours/Week			Credit	% of Total Marks				
Code	Course Title	L	T	P		CA	TA	Int. Total	Ext.	Total
	Elective IV	3	0	0	3	20	20	40	60	100
	Elective V	3	0	0	3	20	20	40	60	100
	Elective VI	3	0	0	3	20	20	40	60	100
OEC002	HRD & OB *	3	0	0	3	20	20	40	60	100
BTDS06	Pattern Recognition	4	0	0	4	20	20	40	60	100
PRACTICALS										
PROJ-CS70	Project-II**	0	0	6	3	20	20	40	60	100
BTDS06P	Pattern Recognition	0	0	2	1	20	20	40	60	100
Total		**12**	**0**	**8**	**16**					

EIGHTH SEMESTER

COURSE		Contact Hours/Week			Credit	% of Total Marks				
Code	Course Title	L	T	P		CA	TA	Int. Total	Ext.	Total
OEC003	Cyber Law & Ethics	3	0	0	3	20	20	40	60	100
OEC004	History of Science & engineering/Introduction to Philosophical Thoughts/Metro Systems and Engineering	3	0	0	3	20	20	40	60	100
BTDS07	IOT with Real Life Applications	4	0	0	4	20	20	40	60	100
PRACTICALS										
PROJ-CS80	Project III**	0	0	12	6	100	100	200	300	500
Total		**10**	**0**	**12**	**16**					

*** HRD & OB- Human Resource Development & Organizational Behavior**

**** Project Synopsis Seminar**

****The marks will be awarded on the basis of Industrial Project Training in 8th semester**