



(COIMBATORE)

**M.TECH DATA SCIENCE**  
**CURRICULUM 2020**

## GENERAL INFORMATION

**Course Outcome (CO)** – Statements that describe what students are expected to know, and are able to do at the end of each course. These relate to the skills, knowledge and behaviour that students acquire in their progress through the course.

**Program Outcomes (POs)** – Program Outcomes are statements that describe what students are expected to know and be able to do upon graduating from the Program. These relate to the skills, knowledge, attitude and behaviour that students acquire through the program. NBA has defined the Program Outcomes for each discipline.

### PROGRAM OUTCOMES FOR ENGINEERING

- **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **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.
- **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.
- **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.
- **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
- **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.
- **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.
- **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **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.
- **Project management and finance:** Demonstrate knowledge and understanding of the 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.
- **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.

**SEMESTER I**

Cat.	Code	Title	L T P	Credit
FC	20MA604	Computational Linear Algebra and Optimization for Data Sciences	3 0 1	4
SC	20DS611	Introduction to Machine Learning	2 0 1	3
FC	20DS601	Algorithms and Structures for Data Science	2 0 1	3
SC	20DS612	Real Time Operating System for Embedded Computing	2 0 1	3
SC	20DS613	Embedded Computing for Data Science	2 0 1	3
SC	20RM600	Research Methodology	2 0 0	2
HU	18HU601	Amrita Value Programs		P/F
HU	18HU602	Career Competency - I		P/F
		<b>TOTAL</b>		<b>18</b>

**SEMESTER II**

Cat.	Code	Title	L T P	Credit
SC	20DS614	Machine Learning for Signal Processing and Pattern Classification	2 0 1	3
FC	20DS602	Probabilistic Graphical Models	2 0 1	3
SC	20DS615	Scientific Computing	2 0 1	3
SC	20DS616	Computer Networks and IOT	2 0 1	3
E		Elective-I	2 0 1	3
E		Elective-II	2 0 1	3
HU	18HU603	Career Competency - II	0 0 1	1
		<b>TOTAL</b>		<b>19</b>

**SEMESTER III**

Cat.	Code	Title	L T P	Credit
SC	20DS617	Big Data Framework for Data Science	2 0 1	3
E		Elective-III	2 0 1	3
E		Elective-IV	2 0 1	3
P	20DS798	Dissertation	0 0 8	8
		<b>TOTAL</b>		<b>17</b>

**SEMESTER IV**

Cat.	Code	Title	L T P	Credit
P	20DS799	Dissertation	0 0 12	12
		<b>TOTAL</b>		<b>12</b>

		<b>Total Credits</b>		<b>66</b>
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**List of Courses****Foundation Core**

Course Code	Course	L T P	Credits
20MA604	Computational Linear Algebra and Optimization for Data Sciences	3 0 1	4
20DS601	Algorithms and Structures for Data Science	2 0 1	3
20DS602	Probabilistic Graphical Models	2 0 1	3

**Professional Electives**

Cat	Code	Title	L T P	Credits
E	20DS701	Digital Control Systems	2 0 1	3
E	20DS702	Multivariable Control Systems	2 0 1	3
E	20DS703	Deep Learning in Genomic and Biomedicine	2 0 1	3
E	20DS704	Deep Learning for Biomedical Data Analysis	2 0 1	3
E	20DS705	Speech Processing	2 0 1	3
E	20DS706	Deep Learning for NLP	2 0 1	3
E	20DS707	Social Media Analytics	2 0 1	3

E	20DS708	Deep Learning for Visual Recognition	2 0 1	3
E	20DS709	Deep Learning for Cyber security	2 0 1	3
E	20DS710	Computational Fluid Dynamics	2 0 1	3
E	20DS711	Deep Learning Essential for Self-Driving Car	2 0 1	3
E	20DS712	Introduction to Additive Manufacturing	2 0 1	3
E	20DS713	Unmanned Aerial Vehicles and Essential Control	2 0 1	3
E	20DS714	Computational Robotics and Robotic Operating System	2 0 1	3
E	20DS715	Complex Systems in Engineering, Finance & Biology: Modelling & Analysis	2 0 1	3
E	20DS716	Introduction to Data Analysis	2 0 1	3

**Subject Core**

Course Code	Course	L T P	Credits
20DS611	Introduction to Machine Learning	2 0 1	3
20DS612	Real Time Operating System for Embedded Computing	2 0 1	3
20DS613	Embedded Computing for Data Science	2 0 1	3
20DS614	Machine Learning for Signal Processing and Pattern Classification	2 0 1	3
20DS615	Scientific Computing	2 0 1	3
20DS616	Computer Networks and IOT	2 0 1	3
20DS617	Big Data Framework for Data Science	2 0 1	3
20RM600	Research Methodology	2 0 0	2