

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**B.Tech. in CIVIL ENGINEERING**  
**COURSE STRUCTURE & SYLLABUS (R18)**

Applicable From 2018-19 Admitted Batch

**I YEAR I SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Mathematics - I	3	1	0	4
2	PH102BS	Engineering Physics	3	1	0	4
3	CS103ES	Programming for Problem Solving	3	1	0	4
4	ME104ES	Engineering Graphics	1	0	4	3
5	PH105BS	Engineering Physics Lab ✓	0	0	3	1.5
6	CS106ES	Programming for Problem Solving Lab ✓	0	0	3	1.5
7	*MC109ES	Environmental Science	3	0	0	0
		Induction Programme				
		<b>Total Credits</b>	<b>13</b>	<b>3</b>	<b>10</b>	<b>18</b>

**I YEAR II SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA201BS	Mathematics - II	3	1	0	4
2	CH202BS	Chemistry	3	1	0	4
3	ME203ES	Engineering Mechanics	3	1	0	4
4	ME205ES	Engineering Workshop	1	0	3	2.5
5	EN205HS	English	2	0	0	2
6	CH206BS	Engineering Chemistry Lab. ✓	0	0	3	1.5
7	EN207HS	English Language and Communication Skills Lab ✓	0	0	2	1
		<b>Total Credits</b>	<b>12</b>	<b>3</b>	<b>8</b>	<b>19.0</b>

**II YEAR I SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	CE301PC	Surveying and Geomatics	3	0	0	3
2	CE302PC	Engineering Geology	2	0	0	2
3	CE303PC	Strength of Materials - I	3	1	0	4
4	MA304BS	Probability and Statistics	3	1	0	4
5	CE305PC	Fluid Mechanics	3	1	0	4
6	CE306PC	Surveying Lab ✓	0	0	3	1.5
7	CE307PC	Strength of Materials Lab ✓	0	0	3	1.5
8	CE308PC	Engineering Geology Lab ✓	0	0	2	1
9	*MC309	Constitution of India	3	0	0	0
		<b>Total Credits</b>	<b>17</b>	<b>3</b>	<b>8</b>	<b>21</b>

**II YEAR II SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	EE401ES	Basic Electrical and Electronics Engineering	3	0	0	3

2	CE402ES	Basic Mechanical Engineering for Civil Engineers	2	0	0	2
3	CE403PC	Building Materials, Construction and Planning	3	0	0	3
4	CE404PC	Strength of Materials - II	3	0	0	3
5	CE405PC	Hydraulics and Hydraulic Machinery	3	0	0	3
6	CE406PC	Structural Analysis - I	3	0	0	3
7	CE407PC	Computer aided Civil Engineering Drawing ✓	0	0	3	1.5
8	CE409PC	Hydraulics and Hydraulic Machinery Lab ✓	0	0	3	1.5
9	EE409ES	Basic Electrical and Electronics Engineering Lab ✓	0	0	2	1
10	*MC409	Gender Sensitization Lab	0	0	2	0
<b>Total Credits</b>			<b>17</b>	<b>0</b>	<b>10</b>	<b>21</b>

## III YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
4	CE501	Structural Analysis-II	3	0	0	3
2	CE502PC	Geotechnical Engineering	3	0	0	3
3	CE503PC	Structural Engineering -I (RCC)	3	1	0	4
4	CE504PC	Transportation Engineering	3	0	0	3
5		Professional Elective-I	3	0	0	3
6	SM505MS	Engineering Economics and Accountancy	2	0	0	2
7	CE506PC	Highway Engineering and Concrete Technology Lab	0	0	3	1.5
8	CE507PC	Geotechnical Engineering Lab ✓	0	0	3	1.5
9	EN508HS	Advanced Communication Skills Lab ✓	0	0	2	1
10	*MC509	Intellectual Property Rights	3	0	0	0
<b>Total Credits</b>			<b>20</b>	<b>1</b>	<b>8</b>	<b>22</b>

## III YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	CE601PC	Hydrology & Water Resources Engineering	3	1	0	4
1	CE602PC	Environmental Engineering	3	0	0	3
2	CE603PC	Foundation Engineering	3	0	0	3
3	CE604PC	Structural Engineering -II (Steel)	3	1	0	4
5		Professional Elective -II	3	0	0	3
6		Open Elective -I	3	0	0	3
7	CE605PC	Environmental Engineering Lab ✓	0	0	2	1
8	CE606PC	Computer Aided Design Lab ✓	0	0	2	1
9	*MC609	Environmental Science	3	0	0	0
<b>Total Credits</b>			<b>21</b>	<b>2</b>	<b>4</b>	<b>22</b>

## IV YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	CE701PC	Estimation, Costing and Project Management	3	1	0	4
2		Professional Elective -III	3	0	0	3
3		Professional Elective -IV	3	0	0	3
4		Open Elective -II	3	0	0	3
5	SM702MS	Professional Practice law & Ethics	2	0	0	2

6	CE703PC	Industrial Oriented Mini Project/ Summer Internship ✓	0	0	0	2*
7	CE704PC	Seminar ✓	0	0	2	1
8	CE705PC	Project Stage - I ✓	0	0	6	3
<b>Total Credits</b>			<b>14</b>	<b>1</b>	<b>12</b>	<b>21</b>

## IV YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1		Professional Elective -V	3	0	0	3
2		Professional Elective -VI	3	0	0	3
3		Open Elective -III	3	0	0	3
4	CE801PC	Project Stage-II ✓	0	0	14	7
<b>Total Credits</b>			<b>9</b>	<b>0</b>	<b>14</b>	<b>16</b>

\*MC - Environmental Science – Should be Registered by Lateral Entry Students Only.

\*MC – Satisfactory/Unsatisfactory

Note: Industrial Oriented Mini Project/ Summer Internship is to be carried out during the summer vacation between 6th and 7th semesters. Students should submit report of Industrial Oriented Mini Project/ Summer Internship for evaluation.

## Professional Elective – I

CE511PE	Concrete Technology
CE512PE	Theory of Elasticity
CE513PE	Rock Mechanics

## Professional Elective – II

CE611PE	Prestressed Concrete
CE612PE	Elements of Earth Quake Engineering
CE613PE	Advanced Structural Analysis

## Professional Elective-III

CE711PE	Remote Sensing & GIS
CE712PE	Ground Improvement Techniques
CE713PE	Advanced Structural Design

## Professional Elective -IV

CE721PE	Irrigation and Hydraulic Structures
CE722PE	Pipeline Engineering
CE723PE	Ground Water Hydrology

## Professional Elective –V

CE811PE	Solid Waste Management
CE812PE	Environmental Impact Assessment
CE813PE	Air pollution

## Professional Elective -VI

CE821PE	Airports, Railways and Waterways
CE822PE	Urban Transportation Planning
CE823PE	Finite Element Methods for Civil Engineering

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**B.Tech. in ELECTRICAL AND ELECTRONICS ENGINEERING**  
**COURSE STRUCTURE & SYLLABUS (R18)**

Applicable From 2018-19 Admitted Batch

**I YEAR I SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Mathematics - I	3	1	0	4
2	CH102BS	Chemistry	3	1	0	4
3	EE103ES	Basic Electrical Engineering	3	0	0	3
4	ME105ES	Engineering Workshop	1	0	3	2.5
5	EN105HS	English	2	0	0	2
6	CH106BS	Engineering Chemistry Lab ✓	0	0	3	1.5
7	EN107HS	English Language and Communication Skills Lab ✓	0	0	2	1
8	EE108ES	Basic Electrical Engineering Lab ✓	0	0	2	1
		Induction Programme				
		<b>Total Credits</b>	<b>12</b>	<b>2</b>	<b>10</b>	<b>19</b>

**I YEAR II SEMESTER**

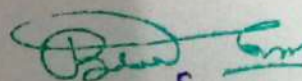
S. No.	Course Code	Course Title	L	T	P	Credits
1	MA201BS	Mathematics - II	3	1	0	4
2	AP202BS	Applied Physics	3	1	0	4
3	CS203ES	Programming for Problem Solving	3	1	0	4
4	ME204ES	Engineering Graphics	1	0	4	3
5	AP205BS	Applied Physics Lab ✓	0	0	3	1.5
6	CS206ES	Programming for Problem Solving Lab ✓	0	0	3	1.5
7	*MC209ES	Environmental Science	3	0	0	0
		<b>Total Credits</b>	<b>13</b>	<b>3</b>	<b>10</b>	<b>18</b>

**II YEAR I SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	EE301ES	Engineering Mechanics	3	1	0	4
2	EE302PC	Electrical Circuit Analysis	3	1	0	4
3	EE303PC	Analog Electronics	3	0	0	3
4	EE304PC	Electrical Machines - I	3	1	0	4
5	EE305PC	Electromagnetic Fields	3	0	0	3
6	EE306PC	Electrical Machines Lab ✓	0	0	2	1
7	EE307PC	Analog Electronics Lab ✓	0	0	2	1
8	EE308PC	Electrical Circuits Lab ✓	0	0	2	1
9	*MC309	Gender Sensitization Lab ✓	0	0	2	0
		<b>Total Credits</b>	<b>15</b>	<b>3</b>	<b>8</b>	<b>21</b>

**II YEAR II SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA401BS	Laplace Transforms, Numerical Methods & Complex variables	3	1	0	4



2	EE402PC	Electrical Machines – II	3	1	0	4
3	EE403PC	Digital Electronics	3	0	0	3
4	EE404PC	Control Systems	3	1	0	4
5	EE405PC	Power System - I	3	0	0	3
6	EE406PC	Digital Electronics Lab ✓	0	0	2	1
7	EE407PC	Electrical Machines Lab ✓ II ✓	0	0	2	1
8	EE408PC	Control Systems Lab ✓	0	0	2	1
9	*MC409	Constitution of India	3	0	0	0
		<b>Total Credits</b>	<b>18</b>	<b>3</b>	<b>6</b>	<b>21</b>

## III YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	EE501PE	Power Electronics	3	1	0	4
2	EE502PE	Power System-II	3	1	0	4
3	EE503PE	Measurements and Instrumentation	3	1	0	4
4		Professional Elective-I	3	0	0	3
5	SM504MS	Business Economics and Financial Analysis	3	0	0	3
6	EE505PC	Power System Simulation Lab ✓	0	0	2	1
7	EE506PC	Power Electronics Lab ✓	0	0	2	1
8	EE507PC	Measurements and Instrumentation Lab ✓	0	0	2	1
9	EN508HS	Advanced Communication Skills Lab ✓	0	0	2	1
10	*MC510	Intellectual Property Rights	3	0	0	0
		<b>Total Credits</b>	<b>18</b>	<b>3</b>	<b>8</b>	<b>22</b>

## III YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1		Open Elective-I	3	0	0	3
2		Professional Elective-II	3	0	0	3
3	EE601PC	Signals and Systems	2	1	0	3
4	EE602PC	Microprocessors & Microcontrollers	3	0	0	3
5	EE603PC	Power System Protection	3	1	0	4
6	EE604PC	Power System Operation and Control	3	0	0	3
7	EE605PC	Power System Lab ✓	0	0	2	1
8	EE606PC	Microprocessors & Microcontrollers Lab ✓	0	0	2	1
9	EE607PC	Signals and Systems Lab ✓	0	0	2	1
10	*MC609	Environmental Science	3	0	0	0
		<b>Total Credits</b>	<b>20</b>	<b>2</b>	<b>6</b>	<b>22</b>

\*MC609 - Environmental Science – Should be Registered by Lateral Entry Students Only.

## IV YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1		Open Elective-II	3	0	0	3
2		Professional Elective-III	3	0	0	3
3		Professional Elective-IV	3	0	0	3
4	SM701MS	Fundamentals of Management for Engineers	3	0	0	3
5	EE701PC	Electrical & Electronics Design Lab ✓	1	0	4	3

6	EE702PC	Industrial Oriented Mini Project/ Summer Internship	0	0	4	2*
7	EE703PC	Seminar	0	0	2	1
	EE704PC	Project Stage	0	0	6	3
		<b>Total Credits</b>	<b>13</b>	<b>0</b>	<b>16</b>	<b>21</b>

## IV YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1		Open Elective-III	3	0	0	3
2		Professional Elective-V	3	0	0	3
3		Professional Elective-VI	3	0	0	3
4	EE8U1PC	Project Stage - II	0	0	14	7
		<b>Total Credits</b>	<b>9</b>	<b>0</b>	<b>14</b>	<b>16</b>

\*MC – Satisfactory/Unsatisfactory

**NOTE:** Industrial Oriented Mini Project/ Summer Internship is to be carried out during the summer vacation between 6th and 7th semesters. Students should submit report of Industrial Oriented Mini Project/ Summer Internship for evaluation.

## Professional Elective - I

EE511PE	Computer Architecture
EE512PE	High Voltage Engineering
EE513PE	Electrical Machine Design

## Professional Elective - II

EE611PE	Optimization Techniques
EE612PE	Power Semiconductor Drives
EE613PE	Wind and Solar Energy systems

## Professional Elective - III

EE711PE	Digital Control systems
EE712PE	Digital Signal Processing
EE713PE	Electrical and Hybrid Vehicles

## Professional Elective - IV

EE721PE	HVDC Transmission
EE722PE	Power System Reliability
EE723PE	Industrial Electrical Systems

## Professional Elective - V

EE811PE	Power Quality & FACTS
EE812PE	Control Systems Design
EE813PE	AI Techniques in Electrical Engineering

## Professional Elective - VI

EE821PE	Smart Grid Technologies
EE822PE	Electrical Distribution Systems
EE823PE	Advanced Control of Electric Drives

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Applicable From 2018-19 Admitted Batch

**I YEAR I SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Mathematics - I	3	1	0	4
2	PH102BS	Engineering Physics	3	1	0	4
3	CS103ES	Programming for Problem Solving	3	1	0	4
4	ME104ES	Engineering Graphics	1	0	4	3
5	PH105BS	Engineering Physics Lab	0	0	3	1.5
6	CS106ES	Programming for Problem Solving Lab	0	0	3	1.5
7	*MC109ES	Environmental Science	3	0	0	0
		Induction Programme				
		<b>Total Credits</b>	<b>13</b>	<b>3</b>	<b>10</b>	<b>18</b>

**I YEAR II SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA201BS	Mathematics - II	3	1	0	4
2	CH202BS	Chemistry	3	1	0	4
3	ME203ES	Engineering Mechanics	3	1	0	4
4	ME205ES	Engineering Workshop	1	0	3	2.5
5	EN205HS	English	2	0	0	2
6	CH206BS	Engineering Chemistry Lab	0	0	3	1.5
7	EN207HS	English Language and Communication Skills Lab	0	0	2	1
		<b>Total Credits</b>	<b>12</b>	<b>3</b>	<b>8</b>	<b>19.0</b>

**II YEAR I SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA301BS	Probability and Statistics & Complex Variables	3	1	0	4
2	ME302PC	Mechanics of Solids	3	1	0	4
3	ME303PC	Material Science and Metallurgy	3	0	0	3
4	ME304PC	Production Technology	3	0	0	3
5	ME305PC	Thermodynamics	3	1	0	4
6	ME306PC	Production Technology Lab	0	0	2	1
7	ME307PC	Machine Drawing Practice	0	0	2	1
8	ME308PC	Material Science and Mechanics of Solids Lab	0	0	2	1
9	*MC309	Constitution of India	3	0	0	0
		<b>Total Credits</b>	<b>18</b>	<b>3</b>	<b>6</b>	<b>21</b>

**II YEAR II SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	EE401ES	Basic Electrical and Electronics Engineering	3	0	0	3

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JNTU HYDERABAD

2	ME402PC	Kinematics of Machinery	3	1	0	4
3	ME403PC	Thermal Engineering - I	3	1	0	4
4	ME404PC	Fluid Mechanics and Hydraulic Machines	3	1	0	4
5	ME405PC	Instrumentation and Control Systems	3	0	0	3
6	EE409ES	Basic Electrical and Electronics Engineering Lab	0	0	2	1
7	ME407PC	Fluid Mechanics and Hydraulic Machines Lab	0	0	2	1
8	ME408PC	Instrumentation and Control Systems Lab	0	0	2	1
10	*MC409	Gender Sensitization Lab	0	0	2	0
<b>Total Credits</b>			<b>15</b>	<b>3</b>	<b>8</b>	<b>21</b>

III YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	ME501PC	Dynamics of Machinery	3	1	0	4
2	ME502PC	Design of Machine Members-I	3	0	0	3
3	ME503PC	Metrology & Machine Tools	3	0	0	3
4	SM504MS	Business Economics & Financial Analysis	3	0	0	3
5	ME505PC	Thermal Engineering-II	3	0	0	3
6	ME506PC	Operations Research	3	0	0	3
7	ME507PC	Thermal Engineering Lab	0	0	2	1
8	ME508PC	Metrology & Machine Tools Lab	0	0	2	1
9	ME509PC	Kinematics & Dynamics Lab	0	0	2	1
10	*MC510	Intellectual Property Rights	3	0	0	0
<b>Total Credits</b>			<b>21</b>	<b>1</b>	<b>6</b>	<b>22</b>

III YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	ME601PC	Design of Machine Members-II	3	0	0	3
2	ME602PC	Heat Transfer	3	1	0	4
3	ME603PC	CAD & CAM	3	0	0	3
4		Professional Elective - I	3	0	0	3
5		Open Elective - I	3	0	0	3
6	ME604PC	Finite Element Methods	3	0	0	3
7	ME605PC	Heat Transfer Lab	0	0	2	1
8	ME606PC	CAD & CAM Lab	0	0	2	1
9	EN608HS	Advanced Communication Skills lab	0	0	2	1
10	*MC609	Environmental Science	3	0	0	0
<b>Total Credits</b>			<b>21</b>	<b>1</b>	<b>6</b>	<b>22</b>

IV YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	ME701PC	Refrigeration & Air Conditioning	3	0	0	3
2		Professional Elective - II	3	0	0	3
3		Professional Elective - III	3	0	0	3
4		Professional Elective - IV	3	0	0	3
5		Open Elective - II	3	0	0	3
6	ME702PC	Industrial Oriented Mini Project/ Summer Internship	0	0	0	2*
7	ME703PC	Seminar	0	0	2	1



8	ME704PC	Project Stage - I	0	0	6	3
		Total Credits	15	0	12	21

## IV YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1		Professional Elective - V	3	0	0	3
2		Professional Elective - VI	3	0	0	3
3		Open Elective - III	3	0	0	3
4	ME801PC	Project Stage - II	0	0	14	7
		Total Credits	9	0	14	16

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\*MC – Satisfactory/Unsatisfactory

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## Professional Elective - I

ME611PE	Unconventional Machining Processes
ME612PE	Machine Tool Design
ME613PE	Production Planning & Control

## Professional Elective - II

ME711PE	Additive Manufacturing
ME712PE	Automation in Manufacturing
ME713PE	MEMS

## Professional Elective - III

ME721PE	Power Plant Engineering
ME722PE	Automobile Engineering
ME723PE	Renewable Energy Sources

## Professional Elective - IV

ME731PE	Computational Fluid Dynamics
ME732PE	Turbo Machinery
ME733PE	Fluid Power Systems

## Professional Elective - V

ME811PE	Industrial Robotics
ME812PE	Mechanical Vibrations
MM813PE	Composite Materials

## Professional Elective - VI

ME821PE	Industrial Management
ME822PE	Production and Operations Management
ME823PE	Tribology

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**I YEAR I SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Mathematics - I	3	1	0	4
2	AP102BS	Applied Physics	3	1	0	4
3	CS103ES	Programming for Problem Solving	3	1	0	4
4	ME104ES	Engineering Graphics	1	0	4	3
5	AP105BS	Applied Physics Lab	0	0	3	1.5
6	CS106ES	Programming for Problem Solving Lab	0	0	3	1.5
7	*MC109ES	Environmental Science	3	0	0	0
		Induction Programme				
		<b>Total Credits</b>	<b>13</b>	<b>3</b>	<b>10</b>	<b>18</b>

**I YEAR II SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA201BS	Mathematics - II	3	1	0	4
2	CH202BS	Chemistry	3	1	0	4
3	EE203ES	Basic Electrical Engineering	3	0	0	3
4	ME205ES	Engineering Workshop	1	0	3	2.5
5	EN205HS	English	2	0	0	2
6	CH206BS	Engineering Chemistry Lab	0	0	3	1.5
7	EN207HS	English Language and Communication Skills Lab	0	0	2	1
8	EE208ES	Basic Electrical Engineering Lab ✓	0	0	2	1
		<b>Total Credits</b>	<b>12</b>	<b>2</b>	<b>10</b>	<b>19</b>

**II YEAR I SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	EC301PC	Electronic Devices and Circuits	3	1	0	4
2	EC302PC	Network Analysis and Transmission Lines	3	0	0	3
3	EC303PC	Digital System Design	3	1	0	4
4	EC304PC	Signals and Systems	3	1	0	4
5	EC305ES	Probability Theory and Stochastic Processes	3	0	0	3
6	EC306PC	Electronic Devices and Circuits Lab ✓	0	0	2	1
7	EC307PC	Digital System Design Lab ✓	0	0	2	1
8	EC308ES	Basic Simulation Lab ✓	0	0	2	1
9	*MC309	Constitution of India	3	0	0	0
		<b>Total Credits</b>	<b>18</b>	<b>3</b>	<b>6</b>	<b>21</b>

**II YEAR II SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA401BS	Laplace Transforms, Numerical Methods & Complex Variables	3	1	0	4
2	EC402PC	Electromagnetic Fields and Waves	3	0	0	3

3	EC403PC	Analog and Digital Communications	3	1	0	4
4	EC404PC	Linear IC Applications	3	0	0	3
5	EC405PC	Electronic Circuit Analysis	3	0	0	3
6	EC406PC	Analog and Digital Communications Lab ✓	0	0	3	1.5
7	EC407PC	IC Applications Lab ✓	0	0	3	1.5
8	EC408PC	Electronic Circuit Analysis Lab ✓	0	0	2	1
9	*MC409	Gender Sensitization Lab	0	0	2	0
		<b>Total Credits</b>	<b>15</b>	<b>2</b>	<b>10</b>	<b>21</b>

## III YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	EC501PC	Microprocessors & Microcontrollers	3	1	0	4
2	EC502PC	Data Communications and Networks	3	1	0	4
3	EC503PC	Control Systems	3	1	0	4
4	SM504MS	Business Economics & Financial Analysis	3	0	0	3
5		Professional Elective - I	3	0	0	3
6	EC505PC	Microprocessors & Microcontrollers Lab ✓	0	0	3	1.5
7	EC506PC	Data Communications and Networks Lab ✓	0	0	3	1.5
8	EN508HS	Advanced Communication Skills Lab ✓	0	0	2	1
9	*MC510	Intellectual Property Rights	3	0	0	0
		<b>Total Credits</b>	<b>18</b>	<b>3</b>	<b>8</b>	<b>22</b>

## III YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	EC601PC	Antennas and Propagation	3	1	0	4
2	EC602PC	Digital Signal Processing	3	1	0	4
3	EC603PC	VLSI Design	3	1	0	4
4		Professional Elective - II	3	0	0	3
5		Open Elective - I	3	0	0	3
6	EC604PC	Digital Signal Processing Lab ✓	0	0	3	1.5
7	EC605PC	e - CAD Lab ✓	0	0	3	1.5
8	EC606PC	Scripting Languages Lab ✓	0	0	2	1
9	*MC609	Environmental Science	3	0	0	0
		<b>Total Credits</b>	<b>18</b>	<b>3</b>	<b>8</b>	<b>22</b>

\*MC609 - Environmental Science – Should be Registered by Lateral Entry Students Only.

## IV YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	EC701PC	Microwave and Optical Communications	3	0	0	3
2		Professional Elective – III	3	0	0	3
3		Professional Elective – IV	3	0	0	3
4		Open Elective - II	3	0	0	3
5	SM702MS	Professional Practice, Law & Ethics	2	0	0	2
6	EC703PC	Microwave and Optical Communications Lab ✓	0	0	2	1
7	EC704PC	Industrial Oriented Mini Project/ Summer Internship ✓	0	0	0	2*
8	EC705PC	Seminar ✓	0	0	2	1
9	EC706PC	Project Stage - I ✓	0	0	6	3
		<b>Total Credits</b>	<b>14</b>	<b>0</b>	<b>10</b>	<b>21</b>

**IV YEAR II SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1		Professional Elective - V	3	0	0	3
2		Professional Elective - VI	3	0	0	3
3		Open Elective - III	3	0	0	3
4	EC801PC	Project Stage - II ✓	0	0	14	7
		<b>Total Credits</b>	<b>9</b>	<b>0</b>	<b>14</b>	<b>16</b>

**\*MC – Satisfactory/Unsatisfactory**

**Note:** Industrial Oriented Mini Project/ Summer Internship is to be carried out during the summer vacation between 6th and 7th semesters. Students should submit report of Industrial Oriented Mini Project/ Summer Internship for evaluation.

**Professional Elective – I**

EC511PE	Computer Organization & Operating Systems
EC512PE	Error Correcting Codes
EC513PE	Electronic Measurements and Instrumentation

**Professional Elective – II**

EC611PE	Object Oriented Programming through Java
EC612PE	Mobile Communications and Networks
EC613PE	Embedded System Design

**Professional Elective – III**

EC711PE	Artificial Neural Networks
EC712PE	Scripting Languages
EC713PE	Digital Image Processing

**Professional Elective – IV**

EC721PE	Biomedical Instrumentation
EC722PE	Database Management Systems
EC723PE	Network Security and Cryptography

**Professional Elective – V**

EC811PE	Satellite Communications
EC812PE	Radar Systems
EC813PE	Wireless Sensor Networks

**Professional Elective – VI**

EC821PE	System on Chip Architecture
EC822PE	Test and Testability
EC823PE	Low Power VLSI Design

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**B.Tech. in COMPUTER SCIENCE AND ENGINEERING**  
**COURSE STRUCTURE & SYLLABUS (R18)**

Applicable From 2018-19 Admitted Batch

**I YEAR I SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Mathematics - I	3	1	0	4
2	CH102BS	Chemistry	3	1	0	4
3	EE103ES	Basic Electrical Engineering	3	0	0	3
4	ME105ES	Engineering Workshop	1	0	3	2.5
5	EN105HS	English	2	0	0	2
6	CH106BS	Engineering Chemistry Lab	0	0	3	1.5
7	EN107HS	English Language and Communication Skills Lab	0	0	2	1
8	EE108ES	Basic Electrical Engineering Lab	0	0	2	1
		Induction Programme				
		<b>Total Credits</b>	<b>12</b>	<b>2</b>	<b>10</b>	<b>19</b>

**I YEAR II SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA201BS	Mathematics - II	3	1	0	4
2	AP202BS	Applied Physics	3	1	0	4
3	CS203ES	Programming for Problem Solving	3	1	0	4
4	ME204ES	Engineering Graphics	1	0	4	3
5	AP205BS	Applied Physics Lab	0	0	3	1.5
6	CS206ES	Programming for Problem Solving Lab	0	0	3	1.5
7	*MC209ES	Environmental Science	3	0	0	0
		<b>Total Credits</b>	<b>13</b>	<b>3</b>	<b>10</b>	<b>18</b>

**II YEAR I SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	CS301ES	Analog and Digital Electronics	3	0	0	3
2	CS302PC	Data Structures	3	1	0	4
3	MA303BS	Computer Oriented Statistical Methods	3	1	0	4
4	CS304PC	Computer Organization and Architecture	3	0	0	3
5	CS305PC	Object Oriented Programming using C++	2	0	0	2
6	CS306ES	Analog and Digital Electronics Lab	0	0	2	1
7	CS307PC	Data Structures Lab	0	0	3	1.5
8	CS308PC	IT Workshop Lab	0	0	3	1.5
9	CS309PC	C++ Programming Lab	0	0	2	1
10	*MC309	Gender Sensitization Lab	0	0	2	0
		<b>Total Credits</b>	<b>14</b>	<b>2</b>	<b>12</b>	<b>21</b>

## II YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	CS401PC	Discrete Mathematics	3	0	0	3
2	SM402MS	Business Economics & Financial Analysis	3	0	0	3
3	CS403PC	Operating Systems	3	0	0	3
4	CS404PC	Database Management Systems	3	1	0	4
5	CS405PC	Java Programming	3	1	0	4
6	CS406PC	Operating Systems Lab	0	0	3	1.5
7	CS407PC	Database Management Systems Lab	0	0	3	1.5
8	CS408PC	Java Programming Lab	0	0	2	1
9	*MC409	Constitution of India	3	0	0	0
		<b>Total Credits</b>	<b>18</b>	<b>2</b>	<b>8</b>	<b>21</b>

## III YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	CS501PC	Formal Languages & Automata Theory	3	0	0	3
2	CS502PC	Software Engineering	3	0	0	3
3	CS503PC	Computer Networks	3	0	0	3
4	CS504PC	Web Technologies	3	0	0	3
5		Professional Elective-I	3	0	0	3
6		Professional Elective-II	3	0	0	3
7	CS505PC	Software Engineering Lab	0	0	3	1.5
8	CS506PC	Computer Networks & Web Technologies Lab	0	0	3	1.5
9	EN508HS	Advanced Communication Skills Lab	0	0	2	1
10	*MC510	Intellectual Property Rights	3	0	0	0
		<b>Total Credits</b>	<b>21</b>	<b>0</b>	<b>8</b>	<b>22</b>

## III YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	CS601PC	Machine Learning	3	1	0	4
2	CS602PC	Compiler Design	3	1	0	4
3	CS603PC	Design and Analysis of Algorithms	3	1	0	4
4		Professional Elective – III	3	0	0	3
5		Open Elective-I	3	0	0	3
6	CS604PC	Machine Learning Lab	0	0	3	1.5
7	CS605PC	Compiler Design Lab	0	0	3	1.5
8		Professional Elective-III Lab	0	0	2	1
9	*MC609	Environmental Science	3	0	0	0
		<b>Total Credits</b>	<b>18</b>	<b>3</b>	<b>8</b>	<b>22</b>

## IV YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	CS701PC	Cryptography & Network Security	3	0	0	3
2	CS702PC	Data Mining	2	0	0	2

3		Professional Elective -IV	3	0	0	3
4		Professional Elective -V	3	0	0	3
5		Open Elective - II	3	0	0	3
6	CS703PC	Cryptography & Network Security Lab	0	0	2	1
7	CS704PC	Industrial Oriented Mini Project/ Summer Internship	0	0	0	2*
8	CS705PC	Seminar	0	0	2	1
9	CS706PC	Project Stage - I	0	0	6	3
		<b>Total Credits</b>	<b>14</b>	<b>0</b>	<b>10</b>	<b>21</b>

## IV YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	SMS01MS	Organizational Behaviour	3	0	0	3
2		Professional Elective - VI	3	0	0	3
3		Open Elective - III	3	0	0	3
4	CS802PC	Project Stage - II	0	0	14	7
		<b>Total Credits</b>	<b>9</b>	<b>0</b>	<b>14</b>	<b>16</b>

\*MC - Environmental Science – Should be Registered by Lateral Entry Students Only.

\*MC – Satisfactory/Unsatisfactory

Note: Industrial Oriented Mini Project/ Summer Internship is to be carried out during the summer vacation between 6th and 7th semesters. Students should submit report of Industrial Oriented Mini Project/ Summer Internship for evaluation.

## Professional Elective - I

CS511PE	Information Theory & Coding
CS512PE	Advanced Computer Architecture
CS513PE	Data Analytics
CS514PE	Image Processing
CS515PE	Principles of Programming Languages

## Professional Elective - II

CS521PE	Computer Graphics
CS522PE	Advanced Operating Systems
CS523PE	Informational Retrieval Systems
CS524PE	Distributed Databases
CS525PE	Natural Language Processing

## Professional Elective - III

CS611PE	Concurrent Programming
CS612PE	Network Programming
CS613PE	Scripting Languages
CS614PE	Mobile Application Development
CS615PE	Software Testing Methodologies

# Courses in PE - III and PE - III Lab must be in 1-1 correspondence.

## Professional Elective - IV

CS711PE	Graph Theory
CS712PE	Introduction to Embedded Systems

CS713PE	Artificial Intelligence
CS714PE	Cloud Computing
CS715PE	Ad-hoc & Sensor Networks

**Professional Elective - V**

CS721PE	Advanced Algorithms
CS722PE	Real Time Systems
CS723PE	Soft Computing
CS724PE	Internet of Things
CS725PE	Software Process & Project Management

**Professional Elective – VI**

CS811PE	Computational Complexity
CS812PE	Distributed Systems
CS813PE	Neural Networks & Deep Learning
CS814PE	Human Computer Interaction
CS815PE	Cyber Forensics

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**B.Tech. in INFORMATION TECHNOLOGY**  
**COURSE STRUCTURE & SYLLABUS (R18)**

Applicable From 2018-19 Admitted Batch

**I YEAR I SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Mathematics - I	3	1	0	4
2	CH102BS	Chemistry	3	1	0	4
3	EE103ES	Basic Electrical Engineering	3	0	0	3
4	ME105ES	Engineering Workshop	1	0	3	2.5
5	EN105HS	English	2	0	0	2
6	CH106BS	Engineering Chemistry Lab	0	0	3	1.5
7	EN107HS	English Language and Communication Skills Lab	0	0	2	1
8	EE108ES	Basic Electrical Engineering Lab	0	0	2	1
		Induction Programme				
		<b>Total Credits</b>	<b>12</b>	<b>2</b>	<b>10</b>	<b>19</b>

**I YEAR II SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA201BS	Mathematics - II	3	1	0	4
2	AP202BS	Applied Physics	3	1	0	4
3	CS203ES	Programming for Problem Solving	3	1	0	4
4	ME204ES	Engineering Graphics	1	0	4	3
5	AP205BS	Applied Physics Lab	0	0	3	1.5
6	CS206ES	Programming for Problem Solving Lab	0	0	3	1.5
7	*MC209ES	Environmental Science	3	0	0	0
		<b>Total Credits</b>	<b>13</b>	<b>3</b>	<b>10</b>	<b>18</b>

**II YEAR I SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	CS301ES	Analog and Digital Electronics	3	0	0	3
2	CS302PC	Data Structures	3	1	0	4
3	MA303BS	Computer Oriented Statistical Methods	3	1	0	4
4	IT304PC	Computer Organization and Microprocessor	3	0	0	3
5	CS305PC	Object Oriented Programming using C++	2	0	0	2
6	CS306ES	Analog and Digital Electronics Lab ✓	0	0	2	1
7	CS307PC	Data Structures Lab ✓	0	0	3	1.5
8	IT308PC	IT Workshop and Microprocessor Lab ✓	0	0	3	1.5
9	CS309PC	C++ Programming Lab ✓	0	0	2	1
10	*MC309	Gender Sensitization Lab	0	0	2	0
		<b>Total Credits</b>	<b>14</b>	<b>2</b>	<b>12</b>	<b>21</b>

**II YEAR II SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	CS401PC	Discrete Mathematics	3	0	0	3

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2	SM402MS	Business Economics & Financial Analysis	3	0	0	3
3	CS403PC	Operating Systems	3	0	0	3
4	CS404PC	Database Management Systems	3	1	0	4
5	CS405PC	Java Programming	3	1	0	4
6	CS406PC	Operating Systems Lab ✓	0	0	3	1.5
7	CS407PC	Database Management Systems Lab ✓	0	0	3	1.5
8	CS408PC	Java Programming Lab ✓	0	0	2	1
9	*MC409	Constitution of India	3	0	0	0
		<b>Total Credits</b>	<b>18</b>	<b>2</b>	<b>8</b>	<b>21</b>

## III YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	CS501PC	Formal Languages & Automata Theory	3	0	0	3
2	CS502PC	Software Engineering	3	0	0	3
3	IT503PC	Data Communication & Computer Networks	3	1	0	4
4	IT504PC	Web Programming	2	0	0	2
5		Professional Elective - I	3	0	0	3
6		Professional Elective - II	3	0	0	3
7	CS505PC	Software Engineering Lab ✓	0	0	3	1.5
8	IT506PC	Computer Networks & Web Programming Lab ✓	0	0	3	1.5
9	EN508HS	Advanced Communication Skills Lab ✓	0	0	2	1
10	*MC510	Intellectual Property Rights	3	0	0	0
		<b>Total Credits</b>	<b>20</b>	<b>1</b>	<b>8</b>	<b>22</b>

## III YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	IT601PC	Introduction to Embedded Systems	3	0	0	3
2	IT602PC	Principles of Compiler Construction	3	0	0	3
3	IT603PC	Algorithm Design and Analysis	3	0	0	3
4	IT604PC	Internet of Things	3	0	0	3
5		Professional Elective -III	3	0	0	3
6		Open Elective-I	3	0	0	3
7	IT605PC	Embedded Systems & Internet of Things Lab ✓	0	0	3	1.5
8	IT606PC	Compiler Construction Lab ✓	0	0	3	1.5
9		Professional Elective-III Lab ✓	0	0	2	1
10	*MC609	Environmental Science	3	0	0	0
		<b>Total Credits</b>	<b>21</b>	<b>0</b>	<b>8</b>	<b>22</b>

\*MC609 - Environmental Science – Should be Registered by Lateral Entry Students Only.

## IV YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	IT701PC	Information Security	3	0	0	3
2	CS702PC	Data Mining	2	0	0	2
3		Professional Elective -IV	3	0	0	3
4		Professional Elective -V	3	0	0	3
5		Open Elective-II	3	0	0	3
6	IT703PC	Information Security Lab ✓	0	0	2	1

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7	IT704PC	Industrial Oriented Mini Project/ Summer Internship ✓	0	0	0	2*
8	IT705PC	Seminar	0	0	2	1
9	IT706PC	Project Stage - I ✓	0	0	6	3
		<b>Total Credits</b>	<b>14</b>	<b>0</b>	<b>10</b>	<b>21</b>

## IV YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	SM801MS	Organizational Behaviour	3	0	0	3
2		Professional Elective -VI	3	0	0	3
3		Open Elective-III	3	0	0	3
4	IT802PC	Project Stage - II	0	0	14	7
		<b>Total Credits</b>	<b>9</b>	<b>0</b>	<b>14</b>	<b>16</b>

\*MC – Satisfactory/Unsatisfactory

**NOTE:** Industrial Oriented Mini Project/ Summer Internship is to be carried out during the summer vacation between 6th and 7th semesters. Students should submit report of Industrial Oriented Mini Project/ Summer Internship for evaluation.

## Professional Elective - I

IT511PE	Biometrics
CS512PE	Advanced Computer Architecture
CS513PE	Data Analytics
CS514PE	Image Processing
CS515PE	Principles of Programming Languages ✓

## Professional Elective - II

CS521PE	Computer Graphics
IT521PE	Database Security
CS522PE	Advanced Operating Systems ✓
IT523PE	Machine Learning
IT524PE	Pattern Recognition

## Professional Elective - III

IT611PE	Ethical Hacking
CS612PE	Network Programming
CS613PE	Scripting Languages
CS614PE	Mobile Application Development
CS615PE	Software Testing Methodologies ✓

# Courses in PE - III and PE - III Lab must be in 1-1 correspondence.

## Professional Elective -IV

IT711PE	Web Security
IT712PE	High Performance Computing
CS713PE	Artificial Intelligence
CS714PE	Cloud Computing ✓
CS715PE	Ad-hoc & Sensor Networks

## Professional Elective -V

IT721PE	Intrusion Detection Systems
CS722PE	Real Time Systems
CS723PE	Soft Computing
IT724PE	Distributed Databases

CS725PE	Software Process & Project Management ✓
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**Professional Elective -VI**

IT811PE	Natural Language Processing
CS812PE	Distributed Systems
CS813PE	Neural Networks & Deep Learning
CS814PE	Human Computer Interaction ✓
CS815PE	Cyber Forensics

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**B.Tech. in AERONAUTICAL ENGINEERING**  
**COURSE STRUCTURE & SYLLABUS (R18)**

Applicable From 2018-19 Admitted Batch

**I YEAR I SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Mathematics - I	3	1	0	4
2	PH102BS	Engineering Physics	3	1	0	4
3	CS103ES	Programming for Problem Solving	3	1	0	4
4	ME104ES	Engineering Graphics	1	0	4	3
5	PH105BS	Engineering Physics Lab	0	0	3	1.5
6	CS106ES	Programming for Problem Solving Lab	0	0	3	1.5
7	*MC109ES	Environmental Science	3	0	0	0
		Induction Programme				
		<b>Total Credits</b>	<b>13</b>	<b>3</b>	<b>10</b>	<b>18</b>

**I YEAR II SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA201BS	Mathematics - II	3	1	0	4
2	CH202BS	Chemistry	3	1	0	4
3	ME203ES	Engineering Mechanics	3	1	0	4
4	ME205ES	Engineering Workshop	1	0	3	2.5
5	EN205HS	English	2	0	0	2
6	CH206BS	Engineering Chemistry Lab	0	0	3	1.5
7	EN207HS	English Language and Communication Skills Lab	0	0	2	1
		<b>Total Credits</b>	<b>12</b>	<b>3</b>	<b>8</b>	<b>19.0</b>

**II YEAR I SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA301BS	Probability and Statistics & Complex Variables	3	1	0	4
2	EE300ES	Basic Electrical and Electronics Engineering	3	0	0	3
3	AE303PC	Theory of Structures	3	0	0	3
4	AE304PC	Fluid Mechanics and Hydraulics	3	0	0	3
5	AE305PC	Aerodynamics - I	3	1	0	4
6	AE306PC	Mechanics of Solids Lab	0	0	2	1
7	AE307PC	Fluid Mechanics and Hydraulics Lab	0	0	4	2
8	EE309PC	Basic Electrical and Electronics Engineering Lab	0	0	2	1
9	*MC309	Constitution of India	3	0	0	0
		<b>Total Credits</b>	<b>18</b>	<b>2</b>	<b>8</b>	<b>21</b>

**II YEAR II SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	AE401ES	Probability Distributions and Numerical Methods	3	1	0	4
2	AE402PC	Low Speed Aerodynamics	3	0	0	3
3	AE403PC	Aircraft Materials and Production	3	1	0	4
4	AE404PC	Analysis of Aircraft Structures	3	1	0	4
5	AE405PC	Aero-Thermodynamics	3	0	0	3

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6	AE406ES	Aerodynamics Lab	0	0	2	1
7	AE407PC	Aerospace Structures Lab	0	0	2	1
8	AE408PC	Aircraft Materials and Production Lab	0	0	2	1
10	*MC409	Gender Sensitization Lab	0	0	2	0
		<b>Total Credits</b>	<b>15</b>	<b>3</b>	<b>8</b>	<b>21</b>

III YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	AE501PC	Aircraft Propulsion	3	1	0	4
2	AE502PC	High Speed Aerodynamics	3	0	0	3
3	AE503PC	Finite Element Methods	3	0	0	3
4	SM504MS	Business Economics and Financial Analysis	3	0	0	3
5	AE505PC	Aircraft Systems and Controls	3	0	0	3
6	AE505PC	Aircraft Performance and Stability	3	0	0	3
7	AE507PC	Computer Aided Aircraft Engineering Drawing	0	0	2	1
8	AE508PC	Flight Control Lab	0	0	2	1
9	AE509PC	Aircraft Propulsion Lab	0	0	2	1
10	*MC510	Intellectual Property Rights	3	0	0	0
		<b>Total Credits</b>	<b>21</b>	<b>1</b>	<b>6</b>	<b>22</b>

III YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	AE601PC	Space Propulsion	3	0	0	3
2	AE602PC	Computational Aerodynamics	3	1	0	4
3	AE603PC	Helicopter Aerodynamics	3	0	0	3
4		Professional Elective - I	3	0	0	3
5		Open Elective - I	3	0	0	3
6	AE604PC	Aircraft Design	3	0	0	3
7	AE605PC	Aerospace Propulsion Lab	0	0	2	1
8	AE606PC	CFD Lab	0	0	2	1
9	EN608HS	Advanced Communication Skills Lab	0	0	2	1
10	*MC609	Environmental Science	3	0	0	0
		<b>Total Credits</b>	<b>21</b>	<b>1</b>	<b>6</b>	<b>22</b>

IV YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	AE701PC	Vibration and Aero-elasticity	3	0	0	3
2		Professional Elective - II	3	0	0	3
3		Professional Elective - III	3	0	0	3
4		Professional Elective - IV	3	0	0	3
5		Open Elective - II	3	0	0	3
6	AE702PC	Industrial Oriented Mini Project/ Summer Internship	0	0	0	2*
7	AE703PC	Seminar	0	0	2	1
8	AE704PC	Project Stage - I	0	0	6	3
		<b>Total Credits</b>	<b>15</b>	<b>0</b>	<b>8</b>	<b>21</b>

**IV YEAR II SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1		Professional Elective – V	3	0	0	3
2		Professional Elective - VI	3	0	0	3
3		Open Elective - III	3	0	0	3
4	AE801PC	Project Stage - II	0	0	14	7
		<b>Total Credits</b>	<b>9</b>	<b>0</b>	<b>14</b>	<b>16</b>

**Professional Elective – I**

AE611PE	Advanced Solid Mechanics
AE612PE	Design and Analysis of Composite Structures
AE613PE	Unmanned Air Vehicles

**Professional Elective – II**

AE711PE	Space Mechanics
AE712PE	Rockets and Missiles
AE713PE	Wind Tunnel Technique

**Professional Elective – III**

AE721PE	Experimental Aerodynamics
AE722PE	Hypersonic Aerodynamics
AE723PE	Advanced Computational Aerodynamics

**Professional Elective – IV**

AE731PE	Industrial Aerodynamics
ME732PE	Turbo Machinery
AE733PE	Theory of Combustion

**Professional Elective – V**

AE811PE	Heat Transfer
AE812PE	Cryogenics
AE813PE	Aero Engine Design

**Professional Elective – VI**

AE821PE	Precision Engineering
AE822PE	Practical Non-Destructive Testing
AE823PE	CAD/CIM

**\*MC - Environmental Science – Should be Registered by Lateral Entry Students Only.**

**\*MC – Satisfactory/Unsatisfactory**

**Note:** Industrial Oriented Mini Project/ Summer Internship is to be carried out during the summer vacation between 6th and 7th semesters. Students should submit report of Industrial Oriented Mini Project/ Summer Internship for evaluation.

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## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech. in COMPUTER SCIENCE AND ENGINEERING (ARTIFICIAL INTELLIGENCE AND  
MACHINE LEARNING)

## II YEAR COURSE STRUCTURE &amp; SYLLABUS (R18)


Applicable From 2020-21 Admitted Batch

## II YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	CS310PC	Discrete Mathematics	3	0	0	3
2	CS302PC	Data Structures	3	1	0	4
3	MA313BS	Mathematical and Statistical Foundations	3	0	0	3
4	CS304PC	Computer Organization and Architecture	3	0	0	3
5	CS311PC	Python Programming	2	0	0	2
6	SM306MS	Business Economics & Financial Analysis	3	0	0	3
7	CS307PC	Data Structures Lab	0	0	3	1.5
8	CS312PC	Python Programming Lab	0	0	3	1.5
9	*MC309	Gender Sensitization Lab	0	0	2	0
		<b>Total Credits</b>	<b>17</b>	<b>1</b>	<b>8</b>	<b>21</b>

## II YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	CS416PC	Formal Language and Automata Theory	3	0	0	3
2	CS417PC	Software Engineering	3	0	0	3
3	CS403PC	Operating Systems	3	0	0	3
4	CS404PC	Database Management Systems	3	1	0	4
5	CS412PC	Object Oriented Programming using Java	3	1	0	4
6	CS406PC	Operating Systems Lab	0	0	3	1.5
7	CS407PC	Database Management Systems Lab	0	0	3	1.5
8	CS408PC	Java Programming Lab	0	0	2	1
9	*MC409	Constitution of India	3	0	0	0
		<b>Total Credits</b>	<b>18</b>	<b>2</b>	<b>8</b>	<b>21</b>

  
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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech. 1<sup>st</sup> Year Syllabus (w.e.f AY 2018-19)****Common for Civil, ME, AE, ME (M), MME, Mining & Petroleum Engg.****I YEAR I SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Mathematics - I	3	1	0	4
2	PH102BS	Engineering Physics	3	1	0	4
3	CS103ES	Programming for Problem Solving	3	1	0	4
4	ME104ES	Engineering Graphics	1	0	4	3
5	PH105BS	Engineering Physics Lab	0	0	3	1.5
6	CS106ES	Programming for Problem Solving Lab	0	0	3	1.5
7	*MC109ES	Environmental Science	3	0	0	0
		Induction Programme				
		<b>Total Credits</b>	<b>13</b>	<b>3</b>	<b>10</b>	<b>18</b>

**I YEAR II SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA201BS	Mathematics - II	3	1	0	4
2	CH202BS	Chemistry	3	1	0	4
3	ME203ES	Engineering Mechanics	3	1	0	4
4	ME205ES	Engineering workshp	1	0	3	2.5
5	EN205HS	English	2	0	0	2
6	CH206BS	Engineering Chemistry Lab	0	0	3	1.5
7	EN207HS	English Language and Communication Skills Lab	0	0	2	1
		<b>Total Credits</b>	<b>12</b>	<b>3</b>	<b>8</b>	<b>19.0</b>

**\*MC – Satisfied/Unsatisfied**

  
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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech. 1<sup>st</sup> Year Syllabus (w.e.f AY 2018-19)****Common for EEE, CSE & IT****I YEAR I SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Mathematics - I	3	1	0	4
2	CH102BS	Chemistry	3	1	0	4
3	EE103ES	Basic Electrical Engineering	3	0	0	3
4	ME105ES	Engineering Workshop	1	0	3	2.5
5	EN105HS	English	2	0	0	2
6	CH106BS	Engineering Chemistry Lab	0	0	3	1.5
7	EN107HS	English Language and Communication Skills Lab	0	0	2	1
8	EE108ES	Basic Electrical Engineering Lab	0	0	2	1
9	*MC109ES	Environmental Science	3	0	0	0
		Induction Programme				
		<b>Total Credits</b>	<b>15</b>	<b>2</b>	<b>10</b>	<b>19</b>

**I YEAR II SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA201BS	Mathematics - II	3	1	0	4
2	AP202BS	Applied Physics	3	1	0	4
3	CS203ES	Programming for Problem Solving	3	1	0	4
4	ME204ES	Engineering Graphics	1	0	4	3
5	AP205BS	Applied Physics Lab	0	0	3	1.5
6	CS206ES	Programming for Problem Solving Lab	0	0	3	1.5
		<b>Total Credits</b>	<b>10</b>	<b>3</b>	<b>10</b>	<b>18</b>

\*MC – Satisfied/Unsatisfied

  
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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.TECH. CIVIL ENGINEERING

COURSE STRUCTURE & SYLLABUS (2016-17)

II YEAR I SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	MA301BS	Mathematics - IV	4	1	0	4
2	CE302ES	Strength of Materials - I	4	1	0	4
3	CE303ES	Fluid Mechanics - I	4	1	0	4
4	CE304ES	Building Material, Construction and Planning	3	0	0	3
5	CE305ES	Surveying	3	0	0	3
6	CE306ES	Strength of Material Lab ✓	0	0	3	2
7	CE307ES	Computer Aided Design - I Lab ✓	0	0	3	2
8	CE308ES	Surveying lab - I ✓	0	0	3	2
9	*MC300HS	Gender Sensitization Lab ✓	0	0	3	0
		<b>Total Credits</b>	<b>18</b>	<b>3</b>	<b>12</b>	<b>24</b>

II YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	CE401ES	Strength of Material - II	4	1	0	4
2	CE402ES	Fluid Mechanics - II	4	1	0	4
3	CE403ES	Structural Analysis	4	1	0	4
4	CV404ES	Engineering Geology	3	0	0	3
5	SM405MS	Business Economic and Financial Analysis	3	0	0	3
6	CE406ES	Fluid Mechanics Lab ✓	0	0	3	2
7	CE408ES	Surveying - II Lab ✓	0	0	3	2
8	CV407ES	Engineering Geology Lab ✓	0	0	3	2
9	*MC400ES	Environmental Science and Technology ✓	3	0	0	0
		<b>Total Credits</b>	<b>21</b>	<b>3</b>	<b>9</b>	<b>24</b>

\*Satisfactory/ Unsatisfactory

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## JAWAHARLAL NEERU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.TECH. CIVIL ENGINEERING  
III YEAR COURSE STRUCTURE & SYLLABUS (R16)

Admitted From 2016-17 Admitted Batch

## III YEAR I SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	CE501PC	Concrete Technology	4	0	0	4
2	CE502PC	Design of Reinforced Concrete Structures	4	1	0	4
3	CE503PC	Water Resources Engineering	4	0	0	4
4	SM504MS	Fundamentals of Management	3	0	0	3
5		Open Elective -I	3	0	0	3
6	CE505PC	Concrete Technology Lab ✓	0	0	3	2
7	CE506PC	Geographical Information Systems Lab ✓	0	0	3	2
8	CE507PC	Hydraulics and Hydraulic Machinery Lab ✓	0	0	3	2
9	*MC500HS	Professional Ethics	3	0	0	0
		<b>Total Credits</b>	<b>21</b>	<b>1</b>	<b>9</b>	<b>24</b>


## III YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	CE601PC	Design of Steel Structures	4	1	0	4
2	CE602PC	Environmental Engineering	4	0	0	4
3	CE603PC	Soil Mechanics	4	0	0	4
4		Open Elective-II	3	0	0	3
5		Professional Elective-I	3	0	0	3
6	CE604PC	Soil Mechanics Lab ✓	0	0	3	2
7	CE605PC	Computer Aided Design - II Lab ✓	0	0	3	2
8	EN606HS	Advanced English Communication Skills Lab ✓	0	0	3	2
		<b>Total Credits</b>	<b>18</b>	<b>1</b>	<b>9</b>	<b>24</b>

\*During Sumer Vacation between III and IV Years: Industry Oriented Mini Project

## Professional Elective - I

CE611PE	Air Pollution and Control.
CE612PE	Advanced Structural Analysis.
CE613PE	Ground Water Development and Management.
CE614PE	Earth and Rock Fill Dams and Slope Stability.

  
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## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.TECH. CIVIL ENGINEERING  
IV YEAR COURSE STRUCTURE & SYLLABUS (R16)

Admitted From 2016-17 Admitted Batch

## IV YEAR I SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	CE701PC	Transportation Engineering	4	0	0	4
2	CE702PC	Estimation Quantity Surveying and Valuation	4	1	0	4
3		Professional Elective - II	3	0	0	3
4		Professional Elective - III	3	0	0	3
5		Professional Elective -IV	3	0	0	3
6	CE703PC	Transportation Engineering-Lab ✓	0	0	3	2
7	CE704PC	Environmental Engineering Lab ✓	0	0	3	2
8	CE705PC	Industry Oriented Mini Project ✓	0	0	3	2
9	CE706PC	Seminar ✓	0	0	2	1
		<b>Total Credits</b>	<b>17</b>	<b>1</b>	<b>11</b>	<b>24</b>

## IV YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1		Open Elective - III	3	0	0	3
2		Professional Elective -V	3	0	0	3
3		Professional Elective -VI	3	0	0	3
4	CE801PC	Major Project ✓	0	0	30	15
		<b>Total Credits</b>	<b>9</b>	<b>0</b>	<b>30</b>	<b>24</b>

## Professional Elective - I

CE.611PE	Air Pollution and Control.
CE.612PE	Advanced Structural Analysis.
CE.613PE	Ground Water Development and Management.
CE.614PE	Earth and Rock fill Dams and Slope Stability.

## Professional Elective - II

CE.721PE	Stochastic Hydrology.
CE.722PE	Construction Technology and Management
CE.723PE	Foundation Engineering
CE.724PE	Rehabilitation and Retrofitting of Structures.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.TECH. ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE STRUCTURE & SYLLABUS (2016 - 17)

II YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA301BS	Mathamatics – IV	4	1	0	4
2	EE302ES	Electromagnetic Fields	4	1	0	4
3	EE303ES	Electrical Machines-I	4	1	0	4
4	EE304ES	Network Theory	3	0	0	3
5	EE305ES	Electronic Circuits	3	0	0	3
6	EE306ES	Electrical Machines Lab - I	0	0	3	2
7	EC306ES	Electronic Devices & Circuits Lab✓	0	0	3	2
8	EE307ES	Networks Lab✓	0	0	3	2
9	*MC300ES	Environmental Science and Technology	3	0	0	0
		<b>Total Credits</b>	<b>21</b>	<b>3</b>	<b>9</b>	<b>24</b>

II YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	EC401ES	Switching Theory & Logic Design	3	1	0	3
2	EE402ES	Power Systems - I	4	1	0	4
3	EE403ES	Electrical Machines – II	4	1	0	4
4	EE404ES	Control Systems	4	1	0	4
5	SM405MS	Business Economics and Financial Analysis	3	0	0	3
6	EE406ES	Control Systems Lab✓	0	0	3	2
7	EE407ES	Electrical Machines Lab - II✓	0	0	3	2
8	EE408ES	Electronic Circuits Lab✓	0	0	3	2
9	*MC400HS	Gender Sensitization Lab✓	0	0	3	0
		<b>Total Credits</b>	<b>18</b>	<b>4</b>	<b>12</b>	<b>24</b>

  
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## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.TECH. ELECTRICAL AND ELECTRONICS ENGINEERING  
III YEAR COURSE STRUCTURE & SYLLABUS (R16)

Applicable From 2016-17 Admitted Batch

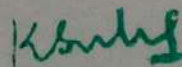
## III YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	EE501PC	Electrical Measurements & Instrumentation	4	1	0	4
2	EE502PC	Power Systems - II	4	1	0	4
3	EI503PC	Microprocessors and Microcontrollers	4	1	0	4
4	SM504MS	Fundamentals of Management	3	0	0	3
5		Open Elective - I	3	0	0	3
6	EE505PC	Electrical Measurements & Instrumentation Lab ✓	0	0	3	2
7	EE506PC	Basic Electrical simulation Lab ✓	0	0	3	2
8	EI507PC	Microprocessors and Microcontrollers Lab ✓	0	0	3	2
9	*MC500HS	Professional Ethics	3	0	0	0
		<b>Total Credits</b>	<b>21</b>	<b>3</b>	<b>9</b>	<b>24</b>

## III YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	EE601PC	Power Systems Analysis	4	1	0	4
2	EE602PC	Power Electronics	4	1	0	4
3	EE603PC	Switch Gear and Protection	4	1	0	4
4		Open Elective - II	3	0	0	3
5		Professional Elective - I	3	0	0	3
6	EE604PC	Power Systems Lab ✓	0	0	3	2
7	EE605PC	Power Electronics Lab ✓	0	0	3	2
8	EN606HS	Advanced English Communication Skills Lab ✓	0	0	3	2
		<b>Total Credits</b>	<b>18</b>	<b>3</b>	<b>9</b>	<b>24</b>

During Summer Vacation between III and IV Years: Industry Oriented Mini Project



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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**B.TECH. ELECTRICAL AND ELECTRONICS ENGINEERING**  
**IV YEAR COURSE STRUCTURE & SYLLABUS (R16)**

Applicable From 2016-17 Admitted Batch

**IV YEAR I SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	EE701PC	Power Semiconductor Drives	4	1	0	4
2	EE702PC	Power System Operation and control	4	1	0	4
3		Professional Elective - II	3	0	0	3
4		Professional Elective - III	3	0	0	3
5		Professional Elective - IV	3	0	0	3
6	EE703PC	Electrical Systems Simulation Lab	0	0	3	2
7	EE704PC	Electrical Workshop	0	0	3	2
8	EE705PC	Industry Oriented Mini Project	0	0	3	2
9	EE706PC	Seminar	0	0	2	1
		<b>Total Credits</b>	<b>17</b>	<b>2</b>	<b>11</b>	<b>24</b>

**IV YEAR II SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1		Open Elective - III	3	0	0	3
2		Professional Elective-V	3	0	0	3
3		Professional Elective-VI	3	0	0	3
4	EE801PC	Major Project	0	0	30	15
		<b>Total Credits</b>	<b>9</b>	<b>0</b>	<b>30</b>	<b>24</b>

**Professional Elective - I (PE - I):**

EM611PE	Computer Organization
EE612PE	Linear Systems Analysis
EE613PE	Linear and Digital IC Applications
EE614PE	Electrical and Electronics Instrumentation

**Professional Elective - II (PE - II):**

EE721PE	Digital Signal Processing
EE722PE	HVDC Transmission
ET721PE	Switch Mode Power Supplies
EE724PE	Reliability Engineering

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B.TECH I YEAR COURSE STRUCTURE AND SYLLABUS (R16)**  
(Common for EEE, ECE, CSE, EIE, BME, IT, ETE, ECM, ICE)

**Applicable From 2017-18 Admitted Batch**

**I YEAR I SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Mathematics-I	3	1	0	3
2	CH102BS	Engineering Chemistry	4	0	0	4
3	PH103BS	Engineering Physics-I	3	0	0	3
4	EN104HS	Professional Communication in English	3	0	0	3
5	ME105ES	Engineering Mechanics	3	0	0	3
6	EE106ES	Basic Electrical and Electronics Engineering	4	0	0	4
7	EN107HS	English Language Communication Skills Lab	0	0	3	2
8	ME108ES	Engineering Workshop	0	0	3	2
9	*EA109MC	NSS	0	0	0	0
		<b>Total Credits</b>	<b>20</b>	<b>1</b>	<b>6</b>	<b>24</b>

**I YEAR II SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	PH201BS	Engineering Physics-II	3	0	0	3
2	MA202BS	Mathematics-II	4	1	0	4
3	MA203BS	Mathematics-III	4	1	0	4
4	CS204ES	Computer Programming in C	3	0	0	3
5	ME205ES	Engineering Graphics	2	0	4	4
6	CH206BS	Engineering Chemistry Lab	0	0	3	2
7	PH207BS	Engineering Physics Lab	0	0	3	2
8	CS208ES	Computer Programming in C Lab	0	0	3	2
9	*EA209MC	NCC/NSO	0	0	0	0
		<b>Total Credits</b>	<b>16</b>	<b>2</b>	<b>13</b>	<b>24</b>

\*Mandatory Course – Satisfactory/Unsatisfactory.

  
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## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING  
II, III, IV YEARS COURSE STRUCTURE & SYLLABUS (R16)

Applicable From 2016-17 Admitted Batch

## II YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA301BS	Mathematics – IV	4	1	0	4
2	EC302ES	Analog Electronics	4	1	0	4
3	EC303ES	Electrical Technology	4	1	0	4
4	EC304ES	Signals and Stochastic Process	3	1	0	3
5	EC305ES	Network Analysis	3	1	0	3
6	EC306ES	Electronic Devices and Circuits Lab ✓	0	0	3	2
7	EC307ES	Basic Simulation Lab ✓	0	0	3	2
8	EC308ES	Basic Electrical Engineering Lab ✓	0	0	3	2
9	*MC300ES	Environmental Science and Technology	3	0	0	0
		<b>Total Credits</b>	<b>21</b>	<b>5</b>	<b>9</b>	<b>24</b>

## II YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	EC401ES	Switching Theory and Logic Design	3	1	0	3
2	EC402ES	Pulse and Digital Circuits	4	0	0	4
3	EE404ES	Control Systems	4	1	0	4
4	EC405ES	Analog Communications	4	0	0	4
5	SM405MS	Business Economics and Financial Analysis	3	0	0	3
6	EC406ES	Analog Communications Lab ✓	0	0	3	2
7	EC407ES	Pulse and Digital Circuits Lab ✓	0	0	3	2
8	EC408ES	Analog Electronics Lab ✓	0	0	3	2
9	*MC400HS	Gender Sensitization Lab	0	0	3	0
		<b>Total Credits</b>	<b>18</b>	<b>2</b>	<b>12</b>	<b>24</b>

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**III YEAR I SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	EC501PC	Electromagnetic Theory and Transmission Lines	4	1	0	4
2	EC502PC	Linear and Digital IC Applications	4	0	0	4
3	EC503PC	Digital Communications	4	1	0	4
4	SM504MS	Fundamentals of Management	3	0	0	3
5		Open Elective – I	3	0	0	3
6	EC505PC	Linear IC Applications Lab ✓	0	0	3	2
7	EC506PC	Digital IC Applications Lab ✓	0	0	3	2
8	EC507PC	Digital Communications Lab ✓	0	0	3	2
9	*MC500HS	Professional Ethics	3	0	0	0
		<b>Total Credits</b>	<b>21</b>	<b>2</b>	<b>9</b>	<b>24</b>

**III YEAR II SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1		Open Elective-II	3	0	0	3
2		Professional Elective-I	3	0	0	3
3	EC601PC	Antennas and Wave Propagation	4	0	0	4
4	EC602PC	Microprocessors and Microcontrollers	4	0	0	4
5	EC603PC	Digital Signal Processing	4	0	0	4
6	EC604PC	Digital Signal Processing Lab ✓	0	0	3	2
7	EC605PC	Microprocessors and Microcontrollers Lab ✓	0	0	3	2
8	EN606HS	Advanced English Communication Skills Lab ✓	0	0	3	2
		<b>Total Credits</b>	<b>18</b>	<b>0</b>	<b>9</b>	<b>24</b>

**During Summer Vacation between III and IV Years: Industry Oriented Mini Project**

**IV YEAR I SEMESTER**

S.No.	Course Code	Course Title	L	T	P	Credits
1	EC701PC	Microwave Engineering	4	0	0	4
2		Professional Elective - II	3	0	0	3
3		Professional Elective - III	3	0	0	3
4		Professional Elective - IV	3	0	0	3
5	EC702PC	VLSI Design	4	0	0	4

6	EC703PC	VLSI and E-CAD Lab ✓	0	0	3	2
7	EC704PC	Microwave Engineering Lab ✓	0	0	3	2
8	EC705PC	Industry Oriented Mini Project ✓	0	0	3	2
9	EC706PC	Seminar	0	0	2	1
		<b>Total Credits</b>	<b>17</b>	<b>0</b>	<b>11</b>	<b>24</b>

## IV YEAR II SEMESTER

S.No.	Course Code	Course Title	L	T	P	Credits
1		Open Elective – III	3	0	0	3
2		Professional Elective -V	3	0	0	3
3		Professional Elective -VI	3	0	0	3
4	EC801PC	Major Project ✓	0	0	30	15
		<b>Total Credits</b>	<b>9</b>	<b>0</b>	<b>30</b>	<b>24</b>

## Professional Elective – I

EC611PE	Computer Organization and Operating System
EC612PE	Digital Image Processing
EC613PE	Spread Spectrum Communications
EC614PE	Digital system Design

## Professional Elective – II

EC721PE	Computer Networks
EC722PE	FPGA Programming
EC723PE	Coding Theory and Techniques
EC724PE	Soft Computing Techniques

## Professional Elective – III

EC731PE	Wireless Communications and Networks
EC732PE	Internet of Things
EC733PE	Radar Systems
EC734PE	Embedded Sytem Design

## Professional Elective – IV

EC741PE	Optimization Techniques
EC742PE	Object Oriented Programming
EC743PE	Electronic Measurements and Instrumentation
EC744PE	Artificial Intelligence

## Professional Elective – V

EC851PE	Network Security and Cryptography
EC852PE	System Design Using FPGAs
EC853PE	Optical Communications
EC854PE	Machine Learning

**Professional Elective – VI**

ECS61PE	Actuators and Robot Systems
ECS62PE	Analog CMOS IC Design
ECS63PE	Global Positioning System
ECS64PE	Computer Vision

\*Open Elective subjects' syllabus is provided in a separate document.

\*Open Elective – Students should take Open Electives from the List of Open Electives Offered by Other Departments/Branches Only.

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With effect from 02/08/2016

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.TECH. COURSE STRUCTURE (2016-17)  
(Common for Civil, ME, AE, ME (M), MME, AU, Mining, Petroleum, CEE, ME (Nanotech))

I YEAR I SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Mathematics-I	3	1	0	3
2	MA102BS	Mathematics-II	4	1	0	4
3	PH103BS	Engineering Physics	3	0	0	3
4	CS104ES	Computer Programming in C	3	0	0	3
5	ME105ES	Engineering Mechanics	3	0	0	3
6	ME106ES	Engineering Graphics	2	0	4	4
7	PH107BS	Engineering Physics Lab	0	0	3	2
8	CS108ES	Computer Programming in C Lab	0	0	3	2
9	*EA109MC	NSS	0	0	0	0
		<b>Total Credits</b>	<b>18</b>	<b>2</b>	<b>10</b>	<b>24</b>

I YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	AP201BS	Applied Physics	3	0	0	3
2	CH202BS	Engineering Chemistry	4	0	0	4
3	MA203BS	Mathematics-III	4	1	0	4
4	EN204HS	Professional Communication in English	3	0	0	3
5	EE205ES	Basic Electrical & Electronics Engineering	4	0	0	4
6	CH206BS	Engineering Chemistry Lab	0	0	3	2
7	EN207HS	English Language Communication Skills Lab	0	0	3	2
8	ME208ES	Engineering Workshop	0	0	3	2
9	*EA209MC	NCC/NSO	0	0	0	0
		<b>Total Credits</b>	<b>18</b>	<b>1</b>	<b>9</b>	<b>24</b>

\*Mandatory Course

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech COURSE STRUCTURE (2016-17)  
(Common for EEE, ECE, CSE, EIL, BME, IT, ETE, ECM, ICE)

I YEAR I SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Mathematics-I	3	1	0	3
2	CH102BS	Engineering Chemistry	4	0	0	4
3	PH103BS	Engineering Physics-I	3	0	0	3
4	EN104HS	Professional Communication in English	3	0	0	3
5	ME105ES	Engineering Mechanics	3	0	0	3
6	EE106ES	Basic Electrical and Electronics Engineering	4	0	0	4
7	EN107HS	English Language Communication Skills Lab	0	0	3	2
8	ME108ES	Engineering Workshop	0	0	3	2
9	*EA109MC	NSS	0	0	0	0
		Total Credits	20	1	6	24

I YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	PH201BS	Engineering Physics-II	3	0	0	3
2	MA202BS	Mathematics-II	4	1	0	4
3	MA203BS	Mathematics-III	4	1	0	4
4	CS204ES	Computer Programming in C	3	0	0	3
5	ME205ES	Engineering Graphics	2	0	4	4
6	CH206BS	Engineering Chemistry Lab	0	0	3	2
7	PH207BS	Engineering Physics Lab	0	0	3	2
8	CS208ES	Computer Programming in C Lab	0	0	3	2
9	*EA209MC	NCC/NSO	0	0	0	0
		Total Credits	16	2	13	24

\*Mandatory Course.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B.TECH. COMPUTER SCIENCE AND ENGINEERING**

**COURSE STRUCTURE & SYLLABUS (2016-17)**

**II YEAR I SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	MA301BS	Mathematics – IV	4	1	0	4
2	CS302ES	Data Structures through C++	4	0	0	4
3	CS303ES	Mathematical Foundations of Computer Science	4	0	0	4
4	CS304ES	Digital Logic Design	3	0	0	3
5	CS305ES	Object Oriented Programming through Java	3	0	0	3
6	CS306ES	Data Structures through C++ Lab	0	0	3	2
7	CS307ES	IT Workshop	0	0	3	2
8	CS308ES	Object Oriented Programming through Java Lab	0	0	3	2
9	*MC300ES	Environmental Science and Technology	3	0	0	0
		<b>Total Credits</b>	<b>21</b>	<b>1</b>	<b>9</b>	<b>24</b>

**II YEAR II SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	CS401BS	Computer Organization	4	0	0	4
2	CS402ES	Database Management Systems	4	0	0	4
3	CS403ES	Operating Systems	4	0	0	4
4	CS404ES	Formal Languages and Automata Theory	3	0	0	3
5	SM405MS	Business Economics and Financial Analysis	3	0	0	3
6	CS406ES	Computer Organization Lab	0	0	3	2
7	CS407ES	Database Management Systems Lab	0	0	3	2
8	CS408ES	Operating Systems Lab	0	0	3	2
9	*MC400HS	Gender Sensitization Lab	0	0	3	0
		<b>Total Credits</b>	<b>18</b>	<b>0</b>	<b>12</b>	<b>24</b>

\* Satisfactory/Unsatisfactory



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.TECH. MECHANICAL ENGINEERING

COURSE STRUCTURE & SYLLABUS (2016-17)

II YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA301BS	Mathematics - IV	4	1	0	4
2	ME304ES	Thermodynamics	4	1	0	4
3	ME302ES	Kinematics of Machinery	4	1	0	4
4	ME305ES	Metallurgy and Material Science	3	0	0	3
5	ME303ES	Mechanics of Solids	3	1	0	3
6	ME306ES	Fuels and Lubricants Lab	0	0	3	2
7	ME307ES	Mechanics of Solids Lab	0	0	3	2
8	ME308ES	Metallurgy and Material Science Lab	0	0	3	2
9	*MC300HS	Gender Sensitization Lab	0	0	3	0
		<b>Total Credits</b>	<b>18</b>	<b>4</b>	<b>12</b>	<b>24</b>

II YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	ME403ES	Dynamics of Machinery	4	1	0	4
2	ME401ES	Fluid Mechanics and Hydraulic Machines	4	1	0	4
3	ME404ES	Machine Drawing	2	0	4	4
4	ME405ES	Manufacturing Process	3	0	0	3
5	SM405MS	Business Economic and Financial Analysis	3	0	0	3
6	MF406ES	Kinematics and Dynamics Lab	0	0	3	2
7	ME407ES	Fluid Mechanics and Hydraulic Machines Lab	0	0	3	2
8	MF408ES	Manufacturing Process Lab	0	0	3	2
9	*MC400ES	Environmental Science and Technology	3	0	0	0
		<b>Total Credits</b>	<b>18</b>	<b>2</b>	<b>15</b>	<b>24</b>

\*Satisfactory/Unsatisfactory

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R16 B.TECH MECHANICAL ENGG.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.TECH. MECHANICAL ENGINEERING  
III YEAR COURSE STRUCTURE & SYLLABUS (R16)

Applicable From 2016-17 Admitted Batch

III YEAR I SEMESTER


S. No.	Course Code	Course Title	L	T	P	Credits
1	ME501PC	Design of Machine Members - I	4	1	0	4
2	ME502PC	Thermal Engineering-I	4	1	0	4
3	ME503PC	Metrology and Machine Tools	4	1	0	4
4	SM504MS	Fundamentals of Management	3	0	0	3
5		Open Elective - I	3	0	0	3
6	ME505PC	Thermal Engineering Lab	0	0	3	2
7	ME506PC	Machine Tools Lab	0	0	3	2
8	ME507PC	Engineering Metrology Lab	0	0	3	2
9	*MC500HS	Professional Ethics	3	0	0	0
		<b>Total Credits</b>	<b>21</b>	<b>3</b>	<b>9</b>	<b>24</b>

III YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	ME601PC	Thermal Engineering -II	4	1	0	4
2	ME602PC	Design of Machine Members-II	4	1	0	4
3	ME603PC	Heat Transfer	4	1	0	4
4		Open Elective - II	3	0	0	3
5		Professional Elective - I	3	0	0	3
6	ME604PC	Heat Transfer Lab	0	0	3	2
7	ME605PC	CADD and MATLAB	0	0	3	2
8	EN606HS	Advanced English Communication Skills Lab	0	0	3	2
		<b>Total Credits</b>	<b>18</b>	<b>3</b>	<b>9</b>	<b>24</b>

During Summer Vacation between III and IV Years: Industry Oriented Mini Project

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**Professional Elective - I**

ME611PE	Finite Element Methods
ME612PE	Refrigeration and Air Conditioning
ME613PE	Machine Tool Design
ME614PE	IC Engines and Gas Turbines

\*Open Elective subjects' syllabus is provided in a separate document.

\*Open Elective – Students should take Open Electives from the List of Open Electives Offered by Other Departments/Branches Only.

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R16 B.TECH MECHANICAL ENGG.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.TECH. MECHANICAL ENGINEERING  
IV YEAR COURSE STRUCTURE & SYLLABUS (R16)

Applicable From 2016-17 Admitted Batch

IV YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	ME701PC	CAD/CAM	4	0	0	4
2	ME702PC	Instrumentation and Control System	4	0	0	4
3		Professional Elective - II	3	0	0	3
4		Professional Elective - III	3	0	0	3
5		Professional Elective - IV	3	0	0	3
6	ME703PC	CAD/CAM Lab	0	0	3	2
7	ME704PC	Instrumentation and Control Systems Lab	0	0	3	2
8	ME705PC	Industry Oriented Mini Project	0	0	3	2
9	ME706PC	Seminar	0	0	2	1
		<b>Total Credits</b>	<b>17</b>	<b>0</b>	<b>11</b>	<b>24</b>

IV YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	-	Open Elective - III	3	0	0	3
2		Professional Elective - V	3	0	0	3
3		Professional Elective - VI	3	0	0	3
4	ME801PC	Major Project	0	0	30	15
		<b>Total Credits</b>	<b>9</b>	<b>0</b>	<b>30</b>	<b>24</b>

Professional Elective - I

ME611PE	Finite Element Methods
ME612PE	Refrigeration and Air Conditioning
ME613PE	Machine Tool Design
ME614PE	IC Engines and Gas Turbines

Professional Elective - II

ME721PE	Composite materials
ME722PE	Industrial Management
ME723PE	Power Plant Engineering
ME724PE	Operations Research

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R16 B.TECH MECHANICAL ENGG.

**Professional Elective – III**

ME731PE	Engineering Tribology
ME732PE	Computational Fluid Dynamics
ME733PE	Robotics
ME734PE	CNC Technology

**Professional Elective - IV**

ME741PE	Mechanical Vibrations
ME742PE	Turbo Machines
ME743PE	MEMS
ME744PE	Additive Manufacturing Technology

**Professional Elective - V**

ME851PE	Automation in Manufacturing
ME852PE	Fluid Power System
ME853PE	Renewable Energy Sources
ME854PE	Production Planning and Control

**Professional Elective - VI**

ME861PE	Automobile Engineering
ME862PE	Advanced Mechanics of Solids
ME863PE	Unconventional Machining Processes
ME864PE	Advanced Materials Technology

\*Open Elective subjects' syllabus is provided in a separate document.

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**R16 B.TECH MECHANICAL ENGG.**

**Professional Elective – III**

ME731PE	Engineering Tribology
ME732PE	Computational Fluid Dynamics
ME733PE	Robotics
ME734PE	CNC Technology

**Professional Elective - IV**

ME741PE	Mechanical Vibrations
ME742PE	Turbo Machines
ME743PE	MEMS
ME744PE	Additive Manufacturing Technology

**Professional Elective - V**

ME851PE	Automation in Manufacturing
ME852PE	Fluid Power System
ME853PE	Renewable Energy Sources
ME854PE	Production Planning and Control

**Professional Elective - VI**

ME861PE	Automobile Engineering
ME862PE	Advanced Mechanics of Solids
ME863PE	Unconventional Machining Processes
ME864PE	Advanced Materials Technology

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**LIST OF OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS FOR**  
**B.TECH. III AND IV YEARS**

S. No.	Name of the Department Offering Open Electives	Open Elective – I (Semester – V)	Open Elective – II (Semester – VI)
1	Aeronautical Engg.	AE511OE: Introduction to Space Technology	AE621OE: Introduction to Aerospace Engineering
2	Automobile Engg.	CE511OE: Disaster Management MT512OE: Intellectual Property Rights	MT621OE: Data Structures MT622OE: Artificial Neural Networks
3	Biomedical Engg.	BM511OE: Reliability Engineering	BM621OE: Medical Electronics
4	Civil Engg.	CE511OE: Disaster Management.	CE621OE: Remote Sensing and GIS CE622OE: Geo-Informatics CE623OE: Intellectual Property Rights
5	Civil and Environmental Engg.	CE511OE: Disaster Management	CN621OE: Environmental Impact Assessment CE623OE: Intellectual Property Rights
6	Computer Science and Engg. / Information Technology	CS511OE: Operating Systems CS512OE: Database Management Systems	CS621OE: Java Programming CS622OE: Software Testing Methodologies CS623OE: Cyber Security
7	Electronics and Communication Engg. / Electronics and Telematics Engg.	EC511OE: Principles of Electronic Communications	EC621OE: Principles of Computer Communications and Networks
8	Electronics and Computer Engg.	EM511OE: Scripting Languages	EM621OE: Soft Computing Techniques
9	Electrical and Electronics Engg.	EE511OE: Non-Conventional Power Generation EE512OE: Electrical Engineering Materials EE513OE: Nanotechnology	EE621OE: Design Estimation and Costing of Electrical Systems EE622OE: Energy Storage Systems EE623OE: Introduction to Mechatronics
10	Electronics and Instrumentation Engg.	EI511OE: Electronic Measurements and Instrumentation	EI621OE: Industrial Electronics
11	Mechanical Engg.	ME511OE: Optimization Techniques ME512OE: Computer Graphics ME513OE: Introduction	ME621OE: World Class Manufacturing ME622OE: Fundamentals of Robotics ME623OE: Fabrication

R16 B.TECH MECHANICAL ENGG.

		to Mechatronics ME514OE: Fundamentals of Mechanical Engineering	Processes
12	Mechanical Engg. (Material Science and Nanotechnology)	NT511OE: Fabrication Processes NT512OE: Non-destructive Testing Methods NT513OE: Fundamentals of Engineering Materials	NT621OE: Introduction to Material Handling NT622OE: Non-Conventional Energy Sources NT623OE: Robotics
13	Mechanical Engg. (mechatronics)	MT511OE: Analog and Digital I.C. Applications MT512OE: Intellectual Property Rights MT513OE: Computer Organization	MT621OE: Data Structures MT622OE: Artificial Neural Networks MT623OE: Industrial Management
14	Metallurgical and Materials Engg.	MM511OE: Materials Characterization Techniques	MM621OE: Science and Technology of Nano Materials MM622OE: Metallurgy of Non Metallurgists
15	Mining Engg.	MN511OE: Introduction to Mining Technology	MN621OE: Coal Gasification, Coal Bed Methane and Shale Gas
16	Petroleum Engg.	PE511OE: Materials Science and Engineering PE512OE: Renewable Energy Sources PE513OE: Environmental Engineering	PE621OE: Energy Management and Conservation PE622OE: Optimization Techniques PE623OE: Entrepreneurship and Small Business Enterprises

S. No.	Name of the Department Offering Open Electives	Open Elective –III (Semester – VIII)
1	Aeronautical Engg.	AE831OE: Air Transportation Systems AE832OE: Rockets and Missiles
2	Automobile Engg.	AM831OE: Introduction to Mechatronics AM832OE: Microprocessors and Microcontrollers
3	Biomedical Engg.	BM831OE: Telemetry and Telecontrol BM832OE: Electromagnetic Interference and Compatibility
4	Civil Engg.	CE831OE: Environmental Impact Assessment CE832OE: Optimization Techniques in Engineering CE833OE: Entrepreneurship and Small Business Enterprises
5	Civil and Environmental Engg.	CN831OE: Remote Sensing and GIS CE833OE: Entrepreneurship and Small Business

  
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R16 B.TECH MECHANICAL ENGG.

		Enterprises
6	Computer Science and Engg. / Information Technology	CS831OE: Linux Programming CS832OE: R Programming CS833OE: PHP Programming
7	Electronics and Communication Engg. / Electronics and Telematics Engg.	EC831OE: Electronic Measuring Instruments
8	Electronics and Computer Engg.	EM831OE: Data Analytics
9	Electrical and Electronics Engg.	EE831OE: Entrepreneur Resource Planning EE832OE: Management Information Systems EE833OE: Organizational Behaviour
10	Electronics and Instrumentation Engg.	EI831OE: Sensors and Transducers, EI832OE: PC Based Instrumentation
11	Mechanical Engg.	ME831OE: Total Quality Management ME832OE: Industrial Safety, Health, and Environmental Engineering ME833OE: Basics of Thermodynamics ME834OE: Reliability Engineering
12	Mechanical Engg. (Material Science and Nanotechnology)	NT831OE: Concepts of Nano Science And Technology NT832OE: Synthesis of Nanomaterials NT833OE: Characterization of Nanomaterials
13	Mechanical Engg. (mechatronics)	MT831OE: Renewable Energy Sources MT832OE: Production Planning and Control CE833OE: Entrepreneurship and Small Business Enterprises
14	Metallurgical and Materials Engg.	MM831OE: Design and Selection of Engineering Materials
15	Mining Engg.	MN831OE: Solid Fuel Technology MN832OE: Health & Safety in Mines
16	Petroleum Engg.	PE831OE: Disaster Management PE832OE: Fundamentals of Liquefied Natural Gas PE833OE: Health, Safety and Environment in Petroleum Industry

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R16 B.TECH MECHANICAL ENGG.

		Enterprises
6	Computer Science and Engg. / Information Technology	CS831OE: Linux Programming CS832OE: R Programming CS833OE: PHP Programming
7	Electronics and Communication Engg. / Electronics and Telematics Engg.	EC831OE: Electronic Measuring Instruments
8	Electronics and Computer Engg.	EM831OE: Data Analytics
9	Electrical and Electronics Engg.	EE831OE: Entrepreneur Resource Planning EE832OE: Management Information Systems EE833OE: Organizational Behaviour
10	Electronics and Instrumentation Engg.	EI831OE: Sensors and Transducers, EI832OE: PC Based Instrumentation
11	Mechanical Engg.	ME831OE: Total Quality Management ME832OE: Industrial Safety, Health, and Environmental Engineering ME833OE: Basics of Thermodynamics ME834OE: Reliability Engineering
12	Mechanical Engg. (Material Science and Nanotechnology)	NT831OE: Concepts of Nano Science And Technology NT832OE: Synthesis of Nanomaterials NT833OE: Characterization of Nanomaterials
13	Mechanical Engg. (mechatronics)	MT831OE: Renewable Energy Sources MT832OE: Production Planning and Control CE833OE: Entrepreneurship and Small Business Enterprises
14	Metallurgical and Materials Engg.	MM831OE: Design and Selection of Engineering Materials
15	Mining Engg.	MN831OE: Solid Fuel Technology MN832OE: Health & Safety in Mines
16	Petroleum Engg.	PE831OE: Disaster Management PE832OE: Fundamentals of Liquefied Natural Gas PE833OE: Health, Safety and Environment in Petroleum Industry

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 MECHANICAL & TECHNOLOGY  
 Building No. 174-500-095.

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.TECH 1 YEAR COURSE STRUCTURE AND SYLLABUS (R16)  
(Common for EEE, ECE, CSE, EIE, BME, IT, ETE, ECM, ICE)

Applicable From 2017-18 Admitted Batch

## 1 YEAR I SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Mathematics-I	3	1	0	3
2	CH102BS	Engineering Chemistry	4	0	0	4
3	PH103BS	Engineering Physics-I	3	0	0	3
4	EN104HS	Professional Communication in English	3	0	0	3
5	ME105ES	Engineering Mechanics	3	0	0	3
6	EE106ES	Basic Electrical and Electronics Engineering	4	0	0	4
7	EN107HS	English Language Communication Skills Lab	0	0	3	2
8	ME108ES	Engineering Workshop	0	0	3	2
9	*EA109MC	NSS	0	0	0	0
		<b>Total Credits</b>	<b>20</b>	<b>1</b>	<b>6</b>	<b>24</b>

## 1 YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	PH201BS	Engineering Physics-II	3	0	0	3
2	MA202BS	Mathematics-II	4	1	0	4
3	MA203BS	Mathematics-III	4	1	0	4
4	CS204ES	Computer Programming in C	3	0	0	3
5	ME205ES	Engineering Graphics	2	0	4	4
6	CH206BS	Engineering Chemistry Lab	0	0	3	2
7	PH207BS	Engineering Physics Lab	0	0	3	2
8	CS208ES	Computer Programming in C Lab	0	0	3	2
9	*EA209MC	NCC/NSO	0	0	0	0
		<b>Total Credits</b>	<b>16</b>	<b>2</b>	<b>13</b>	<b>24</b>

\*Mandatory Course – Satisfactory/Unsatisfactory.

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.TECH. COMPUTER SCIENCE AND ENGINEERING  
II, III, IV YEARS COURSE STRUCTURE & SYLLABUS (R16)

Applicable From 2016-17 Admitted Batch

## II YEAR I SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	MA301BS	Mathematics – IV	4	1	0	4
2	CS302ES	Data Structures through C++	4	0	0	4
3	CS303ES	Mathematical Foundations of Computer Science	4	0	0	4
4	CS304ES	Digital Logic Design	3	0	0	3
5	CS305ES	Object Oriented Programming through Java	3	0	0	3
6	CS306ES	Data Structures through C++ Lab	0	0	3	2
7	CS307ES	IT Workshop	0	0	3	2
8	CS308ES	Object Oriented Programming through Java Lab	0	0	3	2
9	* MC300ES	Environmental Science and Technology	3	0	0	0
		<b>Total Credits</b>	<b>21</b>	<b>1</b>	<b>9</b>	<b>24</b>

## II YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	CS401BS	Computer Organization	4	0	0	4
2	CS402ES	Database Management Systems	4	0	0	4
3	CS403ES	Operating Systems	4	0	0	4
4	CS404ES	Formal Languages and Automata Theory	3	0	0	3
5	SM405MS	Business Economics and Financial Analysis	3	0	0	3
6	CS406ES	Computer Organization Lab	0	0	3	2
7	CS407ES	Database Management Systems Lab	0	0	3	2
8	CS408ES	Operating Systems Lab	0	0	3	2
9	* MC400HS	Gender Sensitization Lab	0	0	3	0
		<b>Total Credits</b>	<b>18</b>	<b>0</b>	<b>12</b>	<b>24</b>

## III YEAR I SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	CS501PC	Design and Analysis of Algorithms	4	0	0	4
2	CS502PC	Data Communication and Computer Networks	4	0	0	4
3	CS503PC	Software Engineering	4	0	0	4
4	SM504MS	Fundamentals of Management	3	0	0	3
5		Open Elective –I	3	0	0	3
6	CS505PC	Design and Analysis of Algorithms Lab	0	0	3	2
7	CS506PC	Computer Networks Lab	0	0	3	2
8	CS507PC	Software Engineering Lab	0	0	3	2
9	*MC500HS	Professional Ethics	3	0	0	0
		<b>Total Credits</b>	<b>21</b>	<b>0</b>	<b>9</b>	<b>24</b>

## III YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	CS601PC	Compiler Design	4	0	0	4
2	CS602PC	Web Technologies	4	0	0	4
3	CS603PC	Cryptography and Network Security	4	0	0	4
4		Open Elective-II	3	0	0	3
5		Professional Elective-I	3	0	0	3
6	CS604PC	Cryptography and Network Security Lab	0	0	3	2
7	CS605PC	Web Technologies Lab	0	0	3	2
8	EN606HS	Advanced English Communication Skills Lab	0	0	3	2
		<b>Total Credits</b>	<b>18</b>	<b>0</b>	<b>9</b>	<b>24</b>

During Summer Vacation between III and IV Years: Industry Oriented Mini Project

## IV YEAR I SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	CS701PC	Data Mining	4	0	0	4
2	CS702PC	Principles of Programming Languages	4	0	0	4
3		Professional Elective – II	3	0	0	3
4		Professional Elective – III	3	0	0	3
5		Professional Elective – IV	3	0	0	3
6	CS703PC	Data Mining Lab	0	0	3	2
7		PE-II Lab #	0	0	3	2
	CS751PC	Python Programming Lab				
	CS752PC	Mobile Application Development Lab				

	CS753PC	Web Scripting Languages Lab				
	CS754PC	Internet of Things Lab				
8	CS705PC	Industry Oriented Mini Project	0	0	3	2
9	CS706PC	Seminar	0	0	2	1
	<b>Total Credits</b>		<b>17</b>	<b>0</b>	<b>11</b>	<b>24</b>

\* Courses in PE - II and PE - II Lab must be in 1-1 correspondence.

#### IV YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1		Open Elective – III	3	0	0	3
2		Professional Elective – V	3	0	0	3
3		Professional Elective – VI	3	0	0	3
4	CS801PC	Major Project	0	0	30	15
	<b>Total Credits</b>		<b>9</b>	<b>0</b>	<b>30</b>	<b>24</b>

#### Professional Elective – I

CS611PE	Mobile Computing
CS612PE	Design Patterns
CS613PE	Artificial Intelligence
CS614PE	Information Security Management (Security Analyst - I)
CS615PE	Introduction to Analytics (Associate Analytics - I)

#### Professional Elective – II

CS721PE	Python Programming
CS722PE	Mobile Application Development
CS723PE	Web Scripting Languages
CS724PE	Internet of Things

#### Professional Elective - III

CS731PE	Graph Theory
CS732PE	Distributed Systems
CS733PE	Machine Learning
CS734PE	Software Process and Project Management

#### Professional Elective - IV

CS741PE	Computational Complexity
CS742PE	Cloud Computing
CS743PE	Blockchain Technology
CS744PE	Social Network Analysis

**Professional Elective - V**

CS851PE	Information Theory & Coding
CS852PE	Real-Time Systems
CS853PE	Data Analytics
CS854PE	Modern Software Engineering

**Professional Elective - VI**

CS861PE	Advanced Algorithms
CS862PE	Web Services and Service Oriented Architecture
CS863PE	Computer Forensics
CS864PE	Neural Networks and Deep Learning

**\*Open Elective subjects' syllabus is provided in a separate document.**

**\*Open Elective – Students should take Open Electives from the List of Open Electives Offered by Other Departments/Branches Only.**

**Ex: - A Student of Mechanical Engineering can take Open Electives from all other departments/branches except Open Electives offered by Mechanical Engineering Dept.**

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With effect from 02/08/2016

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B.Tech COURSE STRUCTURE (2016-17)**  
(Common for EEE, ECE, CSE, EIE, BME, IT, ETE, ECM, ICE)

**I YEAR I SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Mathematics-I	3	1	0	3
2	CH102BS	Engineering Chemistry	4	0	0	4
3	PH103BS	Engineering Physics-I	3	0	0	3
4	EN104HS	Professional Communication in English	3	0	0	3
5	ME105ES	Engineering Mechanics	3	0	0	3
6	EE106ES	Basic Electrical and Electronics Engineering	4	0	0	4
7	EN107HS	English Language Communication Skills Lab	0	0	3	2
8	ME108ES	Engineering Workshop	0	0	3	2
9	*EA109MC	NSS	0	0	0	0
		<b>Total Credits</b>	<b>20</b>	<b>1</b>	<b>3</b>	<b>24</b>

**I YEAR II SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	PH201BS	Engineering Physics-II	3	0	0	3
2	MA202BS	Mathematics-II	4	1	0	4
3	MA203BS	Mathematics-III	4	1	0	4
4	CS204ES	Computer Programming in C	3	0	0	3
5	ME205ES	Engineering Graphics	2	0	4	4
6	CH206BS	Engineering Chemistry Lab	0	0	3	2
7	PH207BS	Engineering Physics Lab	0	0	3	2
8	CS208ES	Computer Programming in C Lab	0	0	3	2
9	*EA209MC	NCC/NSO	0	0	0	0
		<b>Total Credits</b>	<b>16</b>	<b>2</b>	<b>13</b>	<b>24</b>

\*Mandatory Course.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B.TECH. INFORMATION TECHNOLOGY**

**COURSE STRUCTURE & SYLLABUS (2016-17)**


**II YEAR I SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	MA301BS	Mathematics - IV	4	1	0	4
2	CS302ES	Data Structures through C++	4	0	0	4
3	CS303ES	Mathematical Foundations of Computer Science	4	0	0	4
4	CS304ES	Digital Logic Design	3	0	0	3
5	CS305ES	Object Oriented Programming through Java	3	0	0	3
6	CS306ES	Data Structures through C++ Lab ✓	0	0	3	2
7	CS307ES	IT Workshop ✓	0	0	3	2
8	CS308ES	Object Oriented Programming through Java Lab ✓	0	0	3	2
9	* MC300ES	Environmental Science and Technology	3	0	0	0
		<b>Total Credits</b>	<b>21</b>	<b>1</b>	<b>9</b>	<b>24</b>

**II YEAR II SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	CS401BS	Computer Organization	4	0	0	4
2	CS402ES	Database Management Systems	4	0	0	4
3	CS403ES	Operating Systems	4	0	0	4
4	CS404ES	Formal Languages and Automata Theory	3	0	0	3
5	SM405MS	Business Economics and Financial Analysis	3	0	0	3
6	CS406ES	Computer Organization Lab ✓	0	0	3	2
7	CS407ES	Database Management Systems Lab ✓	0	0	3	2
8	CS408ES	Operating Systems Lab ✓	0	0	3	2
9	* MC400HS	Gender Sensitization Lab ✓	0	0	3	0
		<b>Total Credits</b>	<b>18</b>	<b>0</b>	<b>12</b>	<b>24</b>

\* Satisfactory/Unsatisfactory

  
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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B.TECH. INFORMATION TECHNOLOGY  
III YEAR COURSE STRUCTURE & SYLLABUS (R16)**

**Applicable From 2016-17 Admitted Batch**


**III YEAR I SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	CS501PC	Design and Analysis of Algorithms	4	0	0	4
2	CS502PC	Data Communication and Computer Networks	4	0	0	4
3	CS503PC	Software Engineering	4	0	0	4
4	SM504MS	Fundamentals of Management	3	0	0	3
5		Open Elective -I	3	0	0	3
6	CS505PC	Design and Analysis of Algorithms Lab ✓	0	0	3	2
7	CS506PC	Computer Networks Lab ✓	0	0	3	2
8	CS507PC	Software Engineering Lab ✓	0	0	3	2
9	*MC500HS	Professional Ethics	3	0	0	0
		<b>Total Credits</b>	<b>21</b>	<b>0</b>	<b>9</b>	<b>24</b>

**III YEAR II SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	CS601PC	Compiler Design	4	0	0	4
2	CS602PC	Web Technologies	4	0	0	4
3	CS603PC	Cryptography and Network Security	4	0	0	4
4		Open Elective-II	3	0	0	3
5		Professional Elective-I	3	0	0	3
6	CS604PC	Cryptography and Network Security Lab ✓	0	0	3	2
7	CS605PC	Web Technologies Lab ✓	0	0	3	2
8	EN606HS	Advanced English Communication Skills Lab ✓	0	0	3	2
		<b>Total Credits</b>	<b>18</b>	<b>0</b>	<b>9</b>	<b>24</b>

**During Summer Vacation between III and IV Years: Industry Oriented Mini Project**

  
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### Professional Elective – I

CS611PE	Mobile Computing
IT612PE	Object Oriented Analysis and Design ✓
IT613PE	Computer Forensics
CS614PE	Information Security Management (Security Analyst - I)
CS615PE	Introduction to Analytics (Associate Analytics - I)

\*Open Elective subjects' syllabus is provided in a separate document.

\*Open Elective – Students should take Open Electives from the List of Open Electives Offered by Other Departments/Branches Only.

Ex: - A Student of Mechanical Engineering can take Open Electives from all other departments/branches except Open Electives offered by Mechanical Engineering Dept.

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## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.TECH. INFORMATION TECHNOLOGY  
IV YEAR COURSE STRUCTURE & SYLLABUS (R16)

Applicable From 2016-17 Admitted Batch

## IV YEAR I SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	CS701PC	Data Mining	4	0	0	4
2	IT702PC	Android Application Development	4	0	0	4
3		Professional Elective – II	3	0	0	3
4		Professional Elective – III	3	0	0	3
5		Professional Elective – IV	3	0	0	3
6	IT703PC	Android Application Development Lab ✓	0	0	3	2
7		PE-II Lab #	0	0	3	2
	CS751PC	Python Programming Lab ✓				
	CS753PC	Web Scripting Languages Lab				
	IT752PC	Ethical Hacking Lab				
	CS754PC	Internet of Things Lab				
8	IT705PC	Industry Oriented Mini Project ✓	0	0	3	2
9	IT706PC	Seminar	0	0	2	1
		<b>Total Credits</b>	<b>17</b>	<b>0</b>	<b>11</b>	<b>24</b>

# Courses in PE - II and PE - II Lab must be in 1-1 correspondence.

## IV YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1		Open Elective – III	3	0	0	3
2		Professional Elective – V	3	0	0	3
3		Professional Elective – VI	3	0	0	3
4	IT801PC	Major Project ✓	0	0	30	15
		<b>Total Credits</b>	<b>9</b>	<b>0</b>	<b>30</b>	<b>24</b>

## Professional Elective – I

CS611PE	Mobile Computing
IT612PE	Object Oriented Analysis and Design ✓
IT613PE	Computer Forensics
CS614PE	Information Security Management (Security Analyst - I)
CS615PE	Introduction to Analytics (Associate Analytics - I)

12/5/2017  
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**Professional Elective - II #**

CS721PE	Python Programming ✓
CS723PE	Web Scripting Languages
IT722PE	Ethical Hacking
CS724PE	Internet of Things

**Professional Elective - III**

IT731PE	Web and Database Security
IT732PE	Embedded Systems
IT733PE	Artificial Intelligence
CS734PE	Software Process and Project Management ✓

**Professional Elective - IV**

CS743PE	Blockchain Technology
CS742PE	Cloud Computing ✓
CS744PE	Social Network Analysis
IT741PE	Information Retrieval Systems

**Professional Elective -V**

IT851PE	Steganography and Watermarking
CS852PE	Real-Time Systems
CS853PE	Data Analytics
CS854PE	Modern Software Engineering ✓

**Professional Elective -VI**

IT861PE	Intrusion Detection System
IT862PE	ADHOC and Sensor Networks
CS864PE	Neural Networks and Deep Learning
IT863PE	Human Computer Interaction ✓

\*Open Elective subjects' syllabus is provided in a separate document.

\*Open Elective – Students should take Open Electives from the List of Open Electives Offered by Other Departments/Branches Only.

Ex: - A Student of Mechanical Engineering can take Open Electives from all other departments/branches except Open Electives offered by Mechanical Engineering Dept.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**LIST OF OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS FOR**  
**B.TECH. III AND IV YEARS**

S. No.	Name of the Department Offering Open Electives	Open Elective – I (Semester – V)	Open Elective – II (Semester – VI)
1	Aeronautical Engg.	AE511OE: Introduction to Space Technology	AE621OE: Introduction to Aerospace Engineering
2	Automobile Engg.	CE511OE: Disaster Management MT512OE: Intellectual Property Rights	MT621OE: Data Structures MT622OE: Artificial Neural Network
3	Biomedical Engg.	BM511OE: Reliability Engineering	BM621OE: Medical Electronics
4	Civil Engg.	CE511OE: Disaster Management. ✓	CE621OE: Remote Sensing and GIS CE622OE: Geo-Informatics CE623OE: Intellectual Property Rights
5	Civil and Environmental Engg.	CE511OE: Disaster Management	CN621OE: Environmental Impact Assessment CE623OE: Intellectual Property Rights
6	Computer Science and Engg. / Information Technology	CS511OE: Operating Systems CS512OE: Database Management Systems	CS621OE: Java Programming CS622OE: Software Testing Methodologies CS623OE: Cyber Security
7	Electronics and Communication Engg. / Electronics and Telematics Engg.	EC511OE: Principles of Electronic Communications	EC621OE: Principles of Computer Communications and Networks ✓
8	Electronics and Computer Engg.	EM511OE: Scripting Languages	EM621OE: Software Computing Techniques
9	Electrical and Electronics Engg.	EE511OE: Non-Conventional Power Generation EE512OE: Electrical Engineering Materials EE513OE: Nanotechnology	EE621OE: Design Estimation and Costing of Electrical Systems EE622OE: Energy Storage Systems EE623OE: Introduction to Mechatronics
10	Electronics and Instrumentation Engg.	EI511OE: Electronic Measurements and Instrumentation	EI621OE: Industrial Electronics
11	Mechanical Engg.	ME511OE: Optimization Techniques ME512OE: Computer Graphics ME513OE: Introduction	ME621OE: World Class Manufacturing ME622OE: Fundamentals of Robotics ME623OE: Fabrication

  
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		to Mechatronics ME514OE: Fundamentals of Mechanical Engineering	Processes
12	Mechanical Engg. (Material Science and Nanotechnology)	NT511OE: Fabrication Processes NT512OE: Non destructive Testing Methods NT513OE: Fundamentals of Engineering Materials	NT621OE: Introduction to Material Handling NT622OE: Non-Conventional Energy Sources NT623OE: Robotics
13	Mechanical Engg. (mechatronics)	MT511OE: Analog and Digital I.C. Applications MT512OE: Intellectual Property Rights MT513OE: Computer Organization	MT621OE: Data Structures MT622OE: Artificial Neural Networks MT623OE: Industrial Management
14	Metallurgical and Materials Engg.	MM511OE: Materials Characterization Techniques	MM621OE: Science and Technology of Nano Materials MM622OE: Metallurgy of Non Metallurgists
15	Mining Engg.	MN511OE: Introduction to Mining Technology	MN621OE: Coal Gasification, Coal Bed Methane and Shale Gas
16	Petroleum Engg.	PE511OE: Materials Science and Engineering PE512OE: Renewable Energy Sources PE513OE: Environmental Engineering	PE621OE: Energy Management and Conservation PE622OE: Optimization Techniques PE623OE: Entrepreneurship and Small Business Enterprises

S. No.	Name of the Department Offering Open Electives	Open Elective –III (Semester – VIII)
1	Aeronautical Engg.	AE831OE: Air Transportation Systems AE832OE: Rockets and Missiles
2	Automobile Engg.	AM831OE: Introduction to Mechatronics AM832OE: Microprocessors and Microcontrollers
3	Biomedical Engg.	BM831OE: Telemetry and Telecontrol BM832OE: Electromagnetic Interference and Compatibility
4	Civil Engg.	CE831OE: Environmental Impact Assessment CE832OE: Optimization Techniques in Engineering CE833OE: Entrepreneurship and Small Business Enterprises
5	Civil and Environmental Engg.	CN831OE: Remote Sensing and GIS CE833OE: Entrepreneurship and Small Business

  
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		Enterprises
6	Computer Science and Engg. / Information Technology	CS831OE: Linux Programming CS832OE: R Programming CS833OE: PHP Programming
7	Electronics and Communication Engg. / Electronics and Telematics Engg.	EC831OE: Electronic Measuring Instruments
8	Electronics and Computer Engg.	EM831OE: Data Analytics
9	Electrical and Electronics Engg.	EE831OE: Entrepreneur Resource Planning EE832OE: Management Information Systems EE833OE: Organizational Behaviour
10	Electronics and Instrumentation Engg.	EI831OE: Sensors and Transducers, EI832OE: PC Based Instrumentation
11	Mechanical Engg.	ME831OE: Total Quality Management ME832OE: Industrial Safety, Health, and Environmental Engineering ME833OE: Basics of Thermodynamics ME834OE: Reliability Engineering
12	Mechanical Engg. (Material Science and Nanotechnology)	NT831OE: Concepts of Nano Science And Technology NT832OE: Synthesis of Nanomaterials NT833OE: Characterization of Nanomaterials
13	Mechanical Engg. (mechatronics)	MT831OE: Renewable Energy Sources MT832OE: Production Planning and Control CE833OE: Entrepreneurship and Small Business Enterprises
14	Metallurgical and Materials Engg.	MM831OE: Design and Selection of Engineering Materials
15	Mining Engg.	MN831OE: Solid Fuel Technology MN832OE: Health & Safety in Mines
16	Petroleum Engg.	PE831OE: Disaster Management PE832OE: Fundamentals of Liquefied Natural Gas PE833OE: Health, Safety and Environment in Petroleum Industry

**\*Open Elective** – Students should take Open Electives from List of Open Electives Offered by Other Departments/Branches Only.

**Ex:** - A Student of Mechanical Engineering can take Open Electives from all other departments/branches except Open Electives offered by Mechanical Engineering Dept.

*K. Srinivas*  
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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
HYDERABAD.**

**B. TECH. INFORMATION TECHNOLOGY / COMPUTER SCIENCE TECHNOLOGY**

**I YEAR**

Code	Subject	L	T/P/D	C
	English	2	-	4
	Mathematics - I	3	1	6
	Mathematical Methods	3	-	6
	Engineering Physics	3	-	6
	Engineering Chemistry	3	-	6
	Computer Programming	3	-	6
	Engineering Drawing	2	3	6
	Computer Programming Lab.	-	3	4
	Engineering Physics / Engineering Chemistry Lab.	-	3	4
	English Language Communication Skills Lab.	-	3	4
	IT Workshop / Engineering Workshop	-	3	4
	<b>Total</b>	<b>19</b>	<b>16</b>	<b>56</b>

**II YEAR I SEMESTER**

Code	Subject	L	T/P/D	C
	Probability and Statistics	4	-	4
	Mathematical Foundations of Computer Science	4	-	4
	Data Structures	4	-	4
	Digital Logic Design and Computer Organization	4	-	4
	Electronic Devices and Circuits	4	-	4
	Basic Electrical Engineering	4	-	4
	Electrical and Electronics Lab ✓	-	3	2
	Data Structures Lab ✓	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

*Kanish*

PROFESSOR  
M.A. VEER  
INSTITUTE OF SCIENCE & TECHNOLOGY  
Bandlaguda, Hyd-500 005.

**II YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
	Principles of Programming Languages	4	-	4
	Database Management Systems	4	-	4
	Java Programming	4	-	4
	Environmental studies	4	-	4
	Data Communication	4	-	4
	Design and Analysis of Algorithms	4	-	4
	Java Programming Lab ✓	-	3	2
	Database Management Systems Lab ✓	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**III YEAR I SEMESTER**

Code	Subject	L	T/P/D	C
	Automata and Compiler Design	4	-	4
	Linux Programming	4	-	4
	Software Engineering	4	-	4
	Operating Systems	4	-	4
	Computer Networks	4	-	4
	Managerial Economics and Financial Analysis	4	-	4
	Operating Systems Lab ✓	-	3	2
	Computer Networks Lab (Through Linux) ✓	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**III YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
	Web Technologies	4	-	4
	<b>OPEN ELECTIVE</b>	4	-	4
	Human Values and Professional Ethics			
	Intellectual Property Rights			
	Disaster Management			
	Object Oriented Analysis and Design	4	-	4
	Data Warehousing and Data Mining	4	-	4
	Software Testing Methodologies	4	-	4
	Cloud Computing	4	-	4
	Data Mining and Web Technologies Lab ✓	-	3	2
	Advanced Communication Skills Lab ✓	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

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## IV YEAR I SEMESTER

Code	Subject	L	T/P/D	C
	Information Security	4	-	4
	Design Patterns	4	-	4
	Mobile Application Development	4	-	4
	Information Retrieval Systems	4	-	4
	<b>ELECTIVE - I</b>	4	-	4
	Wireless Networks and Mobile Computing			
	Image Processing and Pattern Recognition			
	Soft Computing			
	Semantic Web and Social Networks			
	Operations Research			
	<b>ELECTIVE - II</b>	4	-	4
	Software Project Management			
	Computer Graphics			
	Human Computer Interaction			
	Scripting Languages			
	Computer Forensics			
	Case Tools and Software Testing Lab ✓	-	3	2
	Mobile Applications Development Lab ✓	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

## IV YEAR II SEMESTER

Code	Subject	L	T/P/D	C
	Management Science	4	-	4
	<b>ELECTIVE III</b>	4	-	4
	Web Services			
	E - Commerce			
	Middleware Technologies			
	Ad hoc and Sensor Networks			
	<b>ELECTIVE IV</b>	4	-	4
	Multimedia & Rich Internet Applications			
	Artificial Intelligence			
	Storage Area Networks			
	Machine Learning			
	Industry Oriented Mini Project ✓	-	-	2
	Seminar	-	6	2
	Project Work ✓	-	15	10
	Comprehensive Viva	-	-	2
	<b>Total</b>	<b>12</b>	<b>21</b>	<b>28</b>

Note: All End Examinations (Theory and Practical) are of three hours duration.

T-Tutorial L - Theory P - Practical D-Drawing C - Credits

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With effect from 02/08/2016

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B.TECH. COURSE STRUCTURE (2016-17)**

(Common for Civil, ME, AE, ME (M), MME, AU, Mining, Petroleum, CEE, ME (Nanotech))

**I YEAR I SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Mathematics-I	3	1	0	3
2	MA102BS	Mathematics-II	4	1	0	4
3	PH103BS	Engineering Physics	3	0	0	3
4	CS104ES	Computer Programming in C	3	0	0	3
5	ME105ES	Engineering Mechanics	3	0	0	3
6	ME106ES	Engineering Graphics	2	0	4	4
7	PH107BS	Engineering Physics Lab	0	0	3	2
8	CS108ES	Computer Programming in C Lab	0	0	3	2
9	*EA109MC	NSS	0	0	0	0
		<b>Total Credits</b>	<b>18</b>	<b>2</b>	<b>10</b>	<b>24</b>

**I YEAR II SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	AP201BS	Applied Physics	3	0	0	3
2	CH202BS	Engineering Chemistry	4	0	0	4
3	MA203BS	Mathematics-III	4	1	0	4
4	EN204HS	Professional Communication in English	3	0	0	3
5	EE205ES	Basic Electrical & Electronics Engineering	4	0	0	4
6	CH206BS	Engineering Chemistry Lab	0	0	3	2
7	EN207HS	English Language Communication Skills Lab	0	0	3	2
8	ME208ES	Engineering Workshop	0	0	3	2
9	*EA209MC	NCC/NSO	0	0	0	0
		<b>Total Credits</b>	<b>18</b>	<b>1</b>	<b>9</b>	<b>24</b>

\*Mandatory Course



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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B.Tech COURSE STRUCTURE (2016-17)**  
(Common for EEE, ECE, CSE, EIE, BME, IT, ETE, ECM, ICE)

**I YEAR I SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Mathematics-I	3	1	0	3
2	CH102BS	Engineering Chemistry	4	0	0	4
3	PH103BS	Engineering Physics-I	3	0	0	3
4	EN104HS	Professional Communication in English	3	0	0	3
5	ME105ES	Engineering Mechanics	3	0	0	3
6	EE106ES	Basic Electrical and Electronics Engineering	4	0	0	4
7	EN107HS	English Language Communication Skills Lab	0	0	3	2
8	ME108ES	Engineering Workshop	0	0	3	2
9	*EA109MC	NSS	0	0	0	0
		<b>Total Credits</b>	<b>20</b>	<b>1</b>	<b>6</b>	<b>24</b>

**I YEAR II SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	PH201BS	Engineering Physics-II	3	0	0	3
2	MA202BS	Mathematics-II	4	1	0	4
3	MA203BS	Mathematics-III	4	1	0	4
4	CS204ES	Computer Programming in C	3	0	0	3
5	ME205ES	Engineering Graphics	2	0	4	4
6	CH206BS	Engineering Chemistry Lab	0	0	3	2
7	PH207BS	Engineering Physics Lab	0	0	3	2
8	CS208ES	Computer Programming in C Lab	0	0	3	2
9	*EA209MC	NCC/NSO	0	0	0	0
		<b>Total Credits</b>	<b>16</b>	<b>2</b>	<b>13</b>	<b>24</b>

\* Mandatory Course.



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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech. 1<sup>st</sup> Year Syllabus (w.e.f AY 2018-19)****Common for ECE & EIE****I YEAR I SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Mathematics - I	3	1	0	4
2	AP102BS	Applied Physics	3	1	0	4
3	CS103ES	Programming for Problem Solving	3	1	0	4
4	ME104ES	Engineering Graphics	1	0	4	3
5	AP105BS	Applied Physics Lab	0	0	3	1.5
6	CS106ES	Programming for Problem Solving Lab	0	0	3	1.5
7	*MC109ES	Environmental Science	3	0	0	0
		Induction Programme				
		<b>Total Credits</b>	<b>13</b>	<b>3</b>	<b>10</b>	<b>18</b>

**I YEAR II SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA201BS	Mathematics - II	3	1	0	4
2	CH202BS	Chemistry	3	1	0	4
3	EE203ES	Basic Electrical Engineering	3	0	0	3
4	ME205ES	Engineering Workshop	1	0	3	2.5
5	EN205HS	English	2	0	0	2
6	CH206BS	Engineering Chemistry Lab	0	0	3	1.5
7	EN207HS	English Language and Communication Skills Lab	0	0	2	1
8	EE208ES	Basic Electrical Engineering Lab	0	0	2	1
		<b>Total Credits</b>	<b>12</b>	<b>2</b>	<b>10</b>	<b>19</b>

\*MC – Satisfied/Unsatisfied

  
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**ACADEMIC REGULATIONS R13 FOR B. TECH. (REGULAR)**

**Applicable for the students of B. Tech. (Regular) from the Academic Year 2013-14 and onwards**

- 1. **Award of B. Tech. Degree**  
A student will be declared eligible for the award of B. Tech. Degree if he fulfils the following academic regulations:
  - 1.1 The candidate shall pursue a course of study for not less than four academic years and not more than eight academic years.
  - 1.2 After eight academic years of course of study, the candidate is permitted to write the examinations for two more years.
  - 1.3 The candidate shall register for 224 credits and secure 216 credits with compulsory subjects as listed in Table-1.

**Table 1: Compulsory Subjects**

Serial Number	Subject Particulars
1	All practical subjects
2	Industry oriented mini project
3	Comprehensive Viva-Voce
4	Seminar
5	Project work

- 2 The students, who fail to fulfill all the academic requirements for the award of the degree within ten academic years from the year of their admission, shall forfeit their seats in B. Tech. course.

- 3 **Courses of study**  
The following courses of study are offered at present as specializations for the B. Tech. Course:

Branch Code	Branch
01	Civil Engineering
02	Electrical and Electronics Engineering
03	Mechanical Engineering
04	Electronics and Communication Engineering
05	Computer Science and Engineering
08	Chemical Engineering
10	Electronics and Instrumentation Engineering

  
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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD.

B. TECH. CIVIL ENGINEERING

I YEAR

Code	Subject	L	T/P/D	C
A10001	English	2	-	4
A10002	Mathematics - I	3	1	6
A10302	Engineering Mechanics	3	-	6
A10004	Engineering Physics	3	-	6
A10005	Engineering Chemistry	3	-	6
A10501	Computer Programming	3	-	6
A10301	Engineering Drawing	2	3	6
A10581	Computer Programming Lab ✓	-	3	4
A10081	Engineering Physics & Engineering Chemistry Lab ✓	-	3	4
A10083	English Language Communication Skills Lab ✓	-	3	4
A10082	IT Workshop / Engineering Workshop ✓	-	3	4
	Total	19	16	56

II YEAR I SEMESTER

Code	Subject	L	T/P/D	C
A30006	Mathematics - II	4	-	4
A30203	Electrical & Electronics Engineering	4	-	4
A30107	Strength of Materials -I	4	-	4
A30108	Surveying	4	-	4
A30101	Fluid Mechanics	4	-	4
A30010	Managerial Economics and Financial Analysis	4	-	4
A30185	Surveying Lab-I ✓	-	3	2
A30186	Strength of Materials Lab-I ✓	-	3	2
	Total	24	6	28

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II YEAR II SEMESTER

Code	Subject	L	T/P/D	C
A40008	Probability & Statistics	4	-	4
A40114	Strength of Materials - II	4	-	4
A40111	Hydraulics & Hydraulic Machinery	4	-	4
A40009	Environmental Studies	4	-	4
A40115	Structural Analysis - I	4	-	4
A40109	Building Materials, Construction & Planning	4	-	4
A40186	Computer Aided Drafting of Buildings ✓	-	3	2
A40190	Surveying Lab-II ✓	-	3	2
	Total	24	6	28

III YEAR I SEMESTER

Code	Subject	L	T/P/D	C
A50116	Concrete Technology	4	-	4
A50121	Reinforced Concrete Structures Design and Drawing	4	-	4
A50118	Engineering Geology	4	-	4
A50120	Geotechnical Engineering	4	-	4
A50122	Water Resources Engineering-I	4	-	4
	Open Elective	4	-	4
A50117	Disaster Management			
A50017	Intellectual Property Rights			
A50018	Human Values and Professional Ethics			
A50181	Fluid Mechanics & Hydraulic Machinery Lab ✓	-	3	2
A50191	Engineering Geology Lab ✓	-	3	2
	Total	24	6	28

III YEAR II SEMESTER

Code	Subject	L	T/P/D	C
A60130	Steel Structures Design and Drawing	3	2	4
A60119	Environmental Engineering	4	-	4
A60132	Transportation Engineering - I	4	-	4
A60125	Foundation Engineering	4	-	4
A60131	Structural Analysis - II	4	-	4
	Elective - I	4	-	4
A60123	Elements of Earthquake Engineering			
A60127	Ground Improvement Techniques			
A60128	Ground Water Hydrology			
A60124	Environmental Impact Assessment			
A60129	Principles of Entrepreneurship			
A60104	Geotechnical Engineering Lab ✓	-	3	2
A60086	Advanced Communication Skills Lab ✓	-	3	2
	Total	23	8	28

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## IV YEAR I SEMESTER

Code	Subject	L	T/P/D	C
A70140	Remote Sensing & GIS	4	-	4
A70143	Transportation Engineering -II	4	-	4
A70138	Estimating & Costing	4	-	4
A70133	Water Resources Engineering-II	4	-	4
	<b>Elective-II</b>	4	-	4
A70330	Finite Element Methods			
A70134	Advanced Foundation Engineering			
A70145	Watershed Management			
A70136	Air Pollution and Control			
	<b>Elective-III</b>	4	-	4
A70135	Advanced Structural Design			
A70137	Earth and Rock fill Dams and Slope Stability			
A70144	Water Resources Systems Analysis			
A70139	Industrial Waste Water Treatment			
A70195	Concrete & Highway Materials Lab ✓	-	3	2
A70192	Environmental Engineering Lab ✓	-	3	2
	<b>Total</b>	24	6	28

## IV YEAR II SEMESTER

Code	Subject	L	T/P/D	C
	<b>Elective-IV</b>	4	-	4
A80151	Rehabilitation and Retrofitting of Structures			
A80148	Geo-Environmental Engineering			
A80147	Design and Drawing of Irrigation Structures			
A80141	Solid Waste Management			
A80150	Prestressed Concrete Structures	4	-	4
A80146	Construction Management	4	-	4
A80087	Industry-Oriented Mini project ✓	-	-	2
A80083	Seminar ✓	-	6	2
A80088	Project Work ✓	-	15	10
A80090	Comprehensive viva ✓	-	1	2
	<b>Total</b>	12	21	28

Note: All End Examinations (Theory and Practical) are of three hours duration.  
 T-Tutorial L - Theory P - Practical D-Drawing C - Credits

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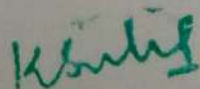
## B. TECH. ELECTRICAL AND ELECTRONICS ENGINEERING

## I YEAR

Code	Subject	L	T/P/D	C
A10001	English	2	-	4
A10002	Mathematics – I	3	1	6
A10003	Mathematical Methods	3	-	6
A10004	Engineering Physics	3	-	6
A10005	Engineering Chemistry	3	-	6
A10501	Computer Programming	3	-	6
A10301	Engineering Drawing ✓	2	3	6
A10581	Computer Programming Lab ✓	-	3	4
A10081	Engineering Physics / Engineering Chemistry Lab ✓	-	3	4
A10083	English Language Communication Skills Lab ✓	-	3	4
A10082	IT Workshop / Engineering Workshop	-	3	4
	<b>Total</b>	<b>19</b>	<b>16</b>	<b>56</b>

## II YEAR I SEMESTER

Code	Subject	L	T/P/D	C
A30007	Mathematics – III	4	-	4
A30102	Fluid Mechanics and Hydraulic Machinery	4	-	4
A30404	Electronic Devices & Circuits	4	-	4
A30204	Electrical Circuits	4	-	4
A30403	Electromagnetic fields	4	-	4
A30206	Electrical Machines-I	4	-	4
A30181	Fluid Mechanics and Hydraulic Machinery Lab ✓	-	3	2
A30482	Electronic devices & Circuit labs ✓	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>



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**II YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
A40010	Managerial Economics & Financial Analysis	4	-	4
A40214	Power Systems-I	4	-	4
A40413	Electronic Circuits	4	-	4
A40407	Switching Theory and Logic Design	4	-	4
A40213	Network Theory	4	-	4
A40212	Electrical Machines-II	4	-	4
A40287	Electrical Machines lab -I ✓	-	3	2
A40286	Electrical Circuits and Simulation Lab ✓	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**III YEAR I SEMESTER**

Code	Subject	L	T/P/D	C
A50423	IC Applications	4	-	4
A50014	Management Science	4	-	4
A50221	Power Systems-II	4	-	4
A50211	Control Systems	4	-	4
A50220	Power Electronics	4	-	4
A50218	Electrical Machines-III	4	-	4
A50289	Electrical Machines lab -II ✓	-	3	2
A50086	Advanced Communication Skills Lab ✓	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**III YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
A60223	Electrical and Electronics Instrumentation	4	-	4
A60225	Static Drives	4	-	4
A60222	Computer Methods in Power Systems	4	-	4
A60430	Microprocessors and Interfacing Devices	4	-	4
A60009	Environmental Studies	4	-	4
	<b>Open Elective</b>	4	-	4
A60117	Disaster Management			
A60017	Intellectual Property Rights			
A60018	Human Values and Professional Ethics			
A60290	Control Systems and Simulation Lab ✓	-	3	2
A60291	Power Electronics and Simulation Lab ✓	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

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## IV YEAR I SEMESTER

Code	Subject	L	T/P/D	C
A70231	Switch Gear and Protection	4	-	4
A70232	Utilization of Electrical Energy	4	-	4
A70421	Digital Signal Processing	4	-	4
A70230	Power System Operation and Control	4	-	4
	<b>Elective-I</b>	4	-	4
A70228	High Voltage Engineering			
A70432	VLSI Design			
A70435	Digital Control Systems			
	<b>Elective-II</b>	4	-	4
A70229	Optimization Techniques			
A70226	Electrical Distribution Systems			
A70227	Electrical Estimation and Costing			
A70498	Microprocessors and Interfacing Devices Lab	-	3	2
A70293	Electrical Measurements Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

## IV YEAR II SEMESTER

Code	Subject	L	T/P/D	C
A80237	Fundamentals of HVDC and FACTS Devices	4	-	4
	<b>Elective-III</b>	4	-	4
A80238	Neural Networks and Fuzzy Logic			
A80324	Renewable Energy Sources			
A80244	Principles of Reliability Engineering			
	<b>Elective-IV</b>	4	-	4
A80234	Advanced Control Systems			
A80235	EHV AC Transmission			
A82909	Nanotechnology			
A80087	Industry Oriented Mini Project	-	-	2
A80089	Seminar	-	6	2
A80088	Project Work	-	15	10
A80090	Comprehensive Viva-Voce	-	-	2
	<b>Total</b>	<b>12</b>	<b>21</b>	<b>28</b>

Note: All End Examinations (Theory and Practical) are of three hours duration.

T-Tutorial L - Theory P - Practical D-Drawing C - Credits

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD.**

**B. TECH. MECHANICAL ENGINEERING**

**I YEAR**

Code	Subject	L	T/P/D	C
A10001	English	2	-	4
A10002	Mathematics – I	3	1	6
A10302	Engineering Mechanics	3	-	6
A10004	Engineering Physics	3	-	6
A10005	Engineering Chemistry	3	-	6
A10501	Computer Programming	3	-	6
A10301	Engineering Drawing	2	3	6
A10581	Computer Programming Lab.	-	3	4
A10081	Engineering Physics & Engineering Chemistry Lab.	-	3	4
A10083	English Language Communication Skills Lab.	-	3	4
A10082	IT Workshop / Engineering Workshop	-	3	4
	<b>Total</b>	<b>19</b>	<b>16</b>	<b>56</b>

**II YEAR I SEMESTER**

Code	Subject	L	T/P/D	C
A30009	Environmental Studies	4	-	4
A30008	Probability and Statistics	4	-	4
A30203	Electrical and Electronics Engineering	4	-	4
A30104	Mechanics of Solids	4	-	4
A30306	Thermodynamics	4	-	4
A31803	Metallurgy and Materials Science	4	-	4
A30281	Electrical and Electronics Engineering Lab	-	3	2
A30085	Metallurgy & Mechanics of Solids Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**II YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
A40312	Production Technology	4	-	4
A40319	Kinematics of Machinery	4	-	4
A40313	Thermal Engineering -I	4	-	4
A40112	Mechanics of Fluids and Hydraulic Machines	4	-	4
A40310	Machine Drawing	-	6	4
A40005	Mathematics-II	4	-	4
A40382	Production Technology Lab	-	3	2
A40188	Mechanics of Fluids & Hydraulic Machines Lab	-	3	2
	<b>Total</b>	<b>20</b>	<b>12</b>	<b>28</b>

**III YEAR I SEMESTER**

Code	Subject	L	T/P/D	C
A50010	Managerial Economics and Financial Analysis	4	-	4
A50318	Engineering Metrology	4	-	4
A50317	Dynamics of Machinery	4	-	4
A50321	Machine Tools	4	-	4
A50316	Design of Machine Members - I	4	-	4
A50326	Thermal Engineering -II	4	-	4
A50384	Machine Tools & Metrology Lab	-	3	2
A50383	Thermal Engineering Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**III YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
A62405	Automobile Engineering	4	-	4
A60330	Finite Element Methods	4	-	4
A60334	Refrigeration and Air Conditioning	4	-	4
A60329	Design of Machine Members - II	4	-	4
A60331	Heat Transfer	4	-	4
A60117	Open Elective Disaster Management	4	-	4
A60017	Intellectual Property Rights			
A60018	Human Values and Professional Ethics			
A60387	Heat Transfer Lab	-	3	2
A60086	Advanced Communication Skills Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**IV YEAR I SEMESTER**

Code	Subject	L	T/P/D	C
A70352	Operations Research	4	-	4
A70353	Power Plant Engineering	4	-	4
A70328	CAD/CAM	4	-	4
A70343	Instrumentation and Control Systems	4	-	4
	<b>ELECTIVE - I</b>	4	-	4
A70355	Robotics			
A70346	Mechanical Vibrations			
A70348	Mechatronics			
A70347	Mechanics of Composite Materials			
A70332	Industrial Management			
	<b>ELECTIVE - II</b>	4	-	4
A70359	Unconventional Machining Processes			
A70337	CNC Technology			
A70336	Automation in Manufacturing			
A70339	Design for Manufacturing			
A72909	Nanotechnology			
A70390	Computer Aided Design & Manufacturing Lab	-	3	2
A70391	Production Drawing Practice and Instrumentation Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**IV YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
A80366	Production Planning and Control	4	-	4
	<b>ELECTIVE - III</b>	4	-	4
A80527	Artificial Neural Networks			
A80367	Total Quality Management			
A80363	Maintenance and Safety Engineering			
A80365	Plant Layout & Material Handling			
	<b>ELECTIVE - IV</b>	4	-	4
A80324	Renewable Energy Sources			
A80362	Jet Propulsion & Rocket Engineering			
A80338	Computational Fluid Dynamics			
A80361	Gas Dynamics			
A80087	Industry Oriented Mini Project	-	-	2
A80089	Seminar	-	6	2
A80068	Project Work	-	15	10
A80090	Comprehensive Viva	-	-	2
	<b>Total</b>	<b>12</b>	<b>21</b>	<b>28</b>

Note: All End Examinations (Theory and Practical) are of three hours duration.  
 T-Tutorial L - Theory P - Practical D-Drawing C - Credits

*Khanif*  
 PRINCIPAL  
 NAVEER  
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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD.****B. TECH. COMPUTER SCIENCE AND ENGINEERING****I YEAR**

Code	Subject	L	T/P/D	C
A10001	English	2	-	4
A10002	Mathematics – I	3	1	6
A10003	Mathematical Methods	3	-	6
A10004	Engineering Physics	3	-	6
A10005	Engineering Chemistry	3	-	6
A10501	Computer Programming	3	-	6
A10301	Engineering Drawing	2	3	6
A10581	Computer Programming Lab.	-	3	4
A10081	Engineering Physics / Engineering Chemistry Lab.	-	3	4
A10083	English Language Communication Skills Lab.	-	3	4
A10082	IT Workshop / Engineering Workshop	-	3	4
	<b>Total</b>	<b>19</b>	<b>16</b>	<b>56</b>

**II YEAR I SEMESTER**

Code	Subject	L	T/P/D	C
A30008	Probability and Statistics	4	-	4
A30504	Mathematical Foundations of Computer Science	4	-	4
A30502	Data Structures	4	-	4
A30401	Digital Logic Design	4	-	4
A30404	Electronic Devices and Circuits	4	-	4
A30202	Basic Electrical Engineering	4	-	4
A30282	Electrical and Electronics Lab	-	3	2
A30582	Data Structures Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

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 Bangalore, Hyderabad

**II YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
A40506	Computer Organization	4	-	4
A40507	Database Management Systems	4	-	4
A40503	Java Programming	4	-	4
A40009	Environmental studies	4	-	4
A40509	Formal Languages and Automata Theory	4	-	4
A40508	Design and Analysis of Algorithms	4	-	4
A40585	Java Programming Lab	-	3	2
A40584	Database Management Systems Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**III YEAR I SEMESTER**

Code	Subject	L	T/P/D	C
A50511	Principles of Programming Languages	4	-	4
	<b>OPEN ELECTIVE</b>	4	-	4
A50018	Human Values and Professional Ethics			
A50017	Intellectual Property Rights			
A50117	Disaster Management			
A50518	Software Engineering	4	-	4
A50514	Compiler Design	4	-	4
A50510	Operating Systems	4	-	4
A50515	Computer Networks	4	-	4
A50589	Operating Systems Lab	-	3	2
A50587	Compiler Design Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**III YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
A60521	Distributed Systems	4	-	4
A60522	Information Security	4	-	4
A60524	Object Oriented Analysis and Design	4	-	4
A60525	Software Testing Methodologies	4	-	4
A60010	Managerial Economics and Financial Analysis	4	-	4
A60512	Web Technologies	4	-	4
A60591	Case Tools and Web Technologies Lab	-	3	2
A60086	Advanced Communication Skills Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

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Bandlaguda, Hyd-500 002.

## IV YEAR I SEMESTER

Code	Subject	L	T/P/D	C
A70511	Linux Programming	4	-	4
A70530	Design Patterns	4	-	4
A70520	Data Warehousing and Data Mining	4	-	4
A70519	Cloud Computing	4	-	4
	<b>ELECTIVE – I</b>	4	-	4
A70540	Software Project Management			
A70532	Image processing and Pattern Recognition			
A70536	Mobile Computing			
A70529	Computer Graphics			
A70352	Operations Research			
	<b>ELECTIVE – II</b>	4	-	4
A70534	Machine Learning			
A70539	Soft Computing			
A70533	Information Retrieval Systems			
A70526	Artificial Intelligence			
A70628	Computer Forensics			
A70596	Linux Programming Lab	-	3	2
A70595	Data Warehousing and Mining Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

## IV YEAR II SEMESTER

Code	Subject	L	T/P/D	C
A80014	Management Science	4	-	4
	<b>ELECTIVE III</b>	4	-	4
A80551	Web Services			
A80538	Semantic Web and Social Networks			
A80537	Scripting Languages			
A80547	Multimedia & Rich Internet Applications			
	<b>ELECTIVE – IV</b>	4	-	4
A80542	Ad hoc and Sensor Networks			
A80550	Storage Area Networks			
A80543	Database Security			
A80439	Embedded Systems			
A80087	Industry Oriented Mini Project	-	-	2
A80089	Seminar	-	6	2
A80088	Project Work	-	15	10
A80090	Comprehensive Viva	-	-	2
	<b>Total</b>	<b>12</b>	<b>21</b>	<b>28</b>

Note: All End Examinations (Theory and Practical) are of three hours duration.

T-Tutorial L – Theory P – Practical D-Drawing C – Credits

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
HYDERABAD.**

**B. TECH. INFORMATION TECHNOLOGY / COMPUTER SCIENCE TECHNOLOGY**

**I YEAR**

Code	Subject	L	T/P/D	C
	English	2	-	4
	Mathematics - I	3	1	6
	Mathematical Methods	3	-	6
	Engineering Physics	3	-	6
	Engineering Chemistry	3	-	6
	Computer Programming	3	-	6
	Engineering Drawing	2	3	6
	Computer Programming Lab.	-	3	4
	Engineering Physics / Engineering Chemistry Lab.	-	3	4
	English Language Communication Skills Lab.	-	3	4
	IT Workshop / Engineering Workshop	-	3	4
	<b>Total</b>	<b>19</b>	<b>16</b>	<b>56</b>

**II YEAR I SEMESTER**

Code	Subject	L	T/P/D	C
	Probability and Statistics	4	-	4
	Mathematical Foundations of Computer Science	4	-	4
	Data Structures	4	-	4
	Digital Logic Design and Computer Organization	4	-	4
	Electronic Devices and Circuits	4	-	4
	Basic Electrical Engineering	4	-	4
	Electrical and Electronics Lab ✓	-	3	2
	Data Structures Lab ✓	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

*K. S. S. S.*

PROFESSOR  
M. A. VEER  
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**II YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
	Principles of Programming Languages	4	-	4
	Database Management Systems	4	-	4
	Java Programming	4	-	4
	Environmental studies	4	-	4
	Data Communication	4	-	4
	Design and Analysis of Algorithms	4	-	4
	Java Programming Lab ✓	-	3	2
	Database Management Systems Lab ✓	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**III YEAR I SEMESTER**

Code	Subject	L	T/P/D	C
	Automata and Compiler Design	4	-	4
	Linux Programming	4	-	4
	Software Engineering	4	-	4
	Operating Systems	4	-	4
	Computer Networks	4	-	4
	Managerial Economics and Financial Analysis	4	-	4
	Operating Systems Lab ✓	-	3	2
	Computer Networks Lab (Through Linux) ✓	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**III YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
	Web Technologies	4	-	4
	<b>OPEN ELECTIVE</b>	4	-	4
	Human Values and Professional Ethics			
	Intellectual Property Rights			
	Disaster Management			
	Object Oriented Analysis and Design	4	-	4
	Data Warehousing and Data Mining	4	-	4
	Software Testing Methodologies	4	-	4
	Cloud Computing	4	-	4
	Data Mining and Web Technologies Lab ✓	-	3	2
	Advanced Communication Skills Lab ✓	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

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## IV YEAR I SEMESTER

Code	Subject	L	T/P/D	C
	Information Security	4	-	4
	Design Patterns	4	-	4
	Mobile Application Development	4	-	4
	Information Retrieval Systems	4	-	4
	<b>ELECTIVE – I</b> Wireless Networks and Mobile Computing Image Processing and Pattern Recognition Soft Computing Semantic Web and Social Networks Operations Research	4	-	4
	<b>ELECTIVE – II</b> Software Project Management Computer Graphics Human Computer Interaction Scripting Languages Computer Forensics	4	-	4
	Case Tools and Software Testing Lab ✓	-	3	2
	Mobile Applications Development Lab ✓	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

## IV YEAR II SEMESTER

Code	Subject	L	T/P/D	C
	Management Science	4	-	4
	<b>ELECTIVE III</b> Web Services E – Commerce Middleware Technologies Ad hoc and Sensor Networks	4	-	4
	<b>ELECTIVE IV</b> Multimedia & Rich Internet Applications Artificial Intelligence Storage Area Networks Machine Learning	4	-	4
	Industry Oriented Mini Project ✓	-	-	2
	Seminar	-	6	2
	Project Work ✓	-	15	10
	Comprehensive Viva	-	-	2
	<b>Total</b>	<b>12</b>	<b>21</b>	<b>28</b>

Note: All End Examinations (Theory and Practical) are of three hours duration.

T-Tutorial L – Theory P – Practical D-Drawing C – Credits

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD.

B. TECH. AERONAUTICAL ENGINEERING

COURSE STRUCTURE & SYLLABUS (R15)

I YEAR

Code	Subject	L	T/P/D	C
A10001	English	2	-	4
A10002	Mathematics – I	3	1	6
A10302	Engineering Mechanics	3	-	6
A10004	Engineering Physics	3	-	6
A10005	Engineering Chemistry	3	-	6
A10501	Computer Programming	3	-	6
A10301	Engineering Drawing	2	3	6
A10581	Computer Programming Lab.	-	3	4
A10081	Engineering Physics & Engineering Chemistry Lab.	-	3	4
A10083	English Language Communication Skills Lab.	-	3	4
A10082	IT Workshop / Engineering Workshop	-	3	4
	<b>Total</b>	<b>19</b>	<b>16</b>	<b>56</b>

II YEAR I SEMESTER

Code	Subject	L	T/P/D	C
A30006	Mathematics – II	4	-	4
A30306	Thermodynamics	4	-	4
A30104	Mechanics of Solids	4	-	4
A30103	Mechanics of Fluids	4	-	4
A32101	Introduction of Aerospace Engg	4	-	4
A30009	Environmental Studies	4	-	4
A32181	Aircraft Engineering Drawing Lab with CAD	-	3	2
A30182	Mechanics of Solids and Mechanics of Fluids Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

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**II YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
A42102	Aerodynamics-I	4	-	4
A42104	Aircraft Production Technology	4	-	4
A40203	Electrical and Electronics Engineering	4	-	4
A42103	Aerospace Vehicle Structures -I	4	-	4
A42106	Introduction to Space Technology	4	-	4
A42105	Flight Mechanics -I	4	-	4
A42182	Aircraft Production Technology Lab	-	3	2
A40281	Electrical and Electronics Engineering Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**III YEAR I SEMESTER**

Code	Subject	L	T/P/D	C
A50014	Management Science	4	-	4
A52111	Flight Mechanics- II	4	-	4
A52107	Aerodynamics- II	4	-	4
A52109	Aerospace Vehicle Structures- II	4	-	4
A52108	Aerospace Propulsion- I	4	-	4
A52110	Air Transportation Systems	4	-	4
A52184	Aerospace Structures Lab	-	3	2
A52183	Aerodynamics and Propulsion Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**III YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
A62114	Computational Aerodynamics	4	-	4
A62115	Conceptual Design of Flight Vehicles	4	-	4
A62112	Aerospace Propulsion- II	4	-	4
A62113	Aircraft Systems	4	-	4
A60330	Finite Element Methods	4	-	4
	<b>Open Elective</b>			
A60117	Disaster Management			
A60017	Intellectual Property Rights			
A60018	Human Values and Professional Ethics	4	-	4
A60086	Advanced Communication Skills Lab	-	3	2
A62185	Flight Vehicle Design & Instrumentation Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

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**IV YEAR I SEMESTER**

Code	Subject	L	T/P/D	C
A72118	Airframe Structural Design	4	-	4
A72122	Mechanical Vibrations and Structural Dynamics	4	-	4
A70328	CAD/CAM	4	-	4
A72119	Control Theory – Application to Flight Control Systems	4	-	4
	<b>Elective – I</b>	4	-	4
A72116	Advanced Computational Aerodynamics			
A72121	Flight Scheduling and Operations			
A72123	Mechanisms and Mechanical Design			
A72125	Theory of Elasticity			
A70008	Probability and Statistics			
	<b>Elective - II</b>	4	-	4
A72124	Space Mechanics			
A72120	Experimental Aerodynamics			
A70352	Operations Research			
A72117	Aircraft Maintenance Engineering			
A72187	Computational Structures Lab	-	3	2
A72186	Computational Aerodynamics Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**IV YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
A82129	Avionics & Instrument Systems	4	-	4
	<b>Elective –III</b>	4	-	4
A82127	Airport Planning and Operations			
A82128	Analysis of Composite Structures			
A82130	Helicopter Engineering			
A82131	Hypersonic Aerodynamics			
	<b>Elective – IV</b>	4	-	4
A80331	Heat Transfer			
A82132	Launch Vehicle and Missile Technology			
A82133	Wind Engineering and Industrial Aerodynamics			
A82126	Aero elasticity			
A80087	Industry Oriented Mini Project	-	-	2
A80089	Seminar	-	6	2
A80088	Project Work	-	15	10
A80090	Comprehensive Viva	-	-	2
	<b>Total</b>	<b>12</b>	<b>21</b>	<b>28</b>

**Note:** All End Examinations (Theory and Practical) are of three hours duration.  
**T-Tutorial L – Theory P – Practical D-Drawing C – Credits**

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**MASTER OF BUSINESS ADMINISTRATION (MBA) R15**

**COURSE STRUCTURE AND SYLLABUS**

**I Year – I Semester**

Category	Course Title	Int. marks	Ext. marks	L	P	C
Core Course II	MANAGEMENT AND ORGANISATIONAL BEHAVIOUR	25	75	3	-	3
Core Course II	BUSINESS LAWS & BUSINESS ENVIRONMENT	25	75	3	-	3
Core Course III	MANAGERIAL ECONOMICS	25	75	3	-	3
Core Course IV	FINANCIAL ACCOUNTING & ANALYSIS	25	75	3	-	3
Core Course V	STATISTICS FOR MANAGEMENT	25	75	3	-	3
Open Elective I	<ul style="list-style-type: none"> <li>• CROSS CULTURE MANAGEMENT</li> <li>• WTO &amp; IPR</li> <li>• TOTAL QUALITY MANAGEMENT</li> <li>• PROJECT MANAGEMENT</li> </ul>	25	75	3	-	3
Laboratory	STATISTICAL DATA ANALYSIS - LAB	50	-	-	4	2
Seminar	BUSINESS COMMUNICATION- SEMINAR	50	-	-	4	2
<b>Total Credits</b>				<b>18</b>	<b>8</b>	<b>22</b>

**I Year - II Semester**

Category	Course Title	Int. marks	Ext. marks	L	P	C
Core Course I	HUMAN RESOURCE MANAGEMENT	25	75	3	-	3
Core Course II	MARKETING MANAGEMENT	25	75	3	-	3
Core Course III	FINANCIAL MANAGEMENT	25	75	3	-	3
Core Course IV	QUANTITATIVE ANALYSIS FOR BUSINESS DECISIONS	25	75	3	-	3
Core Course V	MIS & ERP	25	75	3	-	3
Open Elective I	<ul style="list-style-type: none"> <li>• FOREIGN TRADE</li> <li>• BANKING, INSURANCE &amp; RISK MANAGEMENT</li> <li>• LOGISTICS &amp; SUPPLY CHAIN MANAGEMENT</li> <li>• MSME MANAGEMENT</li> </ul>	25	75	3	-	3
Laboratory	ANNUAL REPORT ANALYSIS - LAB	50	-	-	4	2
Seminar	SUMMER INTERNSHIP - SEMINAR	50	-	-	4	2
<b>Total Credits</b>				<b>18</b>	<b>8</b>	<b>22</b>

**II Year – I Semester**

Category	Course Title	Int. marks	Ext. marks	L	P	C
Core Course I	PRODUCTION & OPERATIONS MANAGEMENT	25	75	3	-	3
Core Course II	STRATEGIC MANAGEMENT	25	75	3	-	3
Core Course III	RESEARCH METHODOLOGY	25	75	3	-	3
Core Elective I	(MRKG/HRM/FIN/SYS)	25	75	3	-	3
Core Elective II	(MRKG/HRM/FIN/SYS)	25	75	3	-	3
Core Elective III	(MRKG/HRM/FIN/SYS)	25	75	3	-	3
Seminar	PERSONAL EFFECTIVENESS - SEMINAR	50	-	-	4	2
Seminar	BUSINESS BEST PRACTICES AND SUCCESS STORIES OF EMERGING LEADERS - SEMINAR	50	-	-	4	2
<b>Total Credits</b>				<b>18</b>	<b>8</b>	<b>22</b>

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II Year - II Semester

Category	Course Title	Int. marks	Ext. marks	L	P	C
Core Course I	ENTREPRENEURSHIP	25	75	3	-	3
Core Course II	MANAGEMENT OF TECHNOLOGY	25	75	3	-	3
Core Elective IV	(MRKG/HRM/FIN/SYS)	25	75	3	-	3
Core Elective V	(MRKG/HRM/FIN/SYS)	25	75	3	-	3
Core Elective VI	(MRKG/HRM/FIN/SYS)	25	75	3	-	3
Seminar	PRE SUBMISSION OF PROJECT –SEMINAR	50	-	-	4	2
	COMPREHENSIVE VIVA	-	100	-	4	2
	PROJECT	25	75	-	-	3
<b>Total Credits</b>				15	8	22

**CORE ELECTIVE STREAMS (choose any one stream subjects as Core Electives)**

<b>MARKETING ELECTIVES</b>
CONSUMER BEHAVIOUR
SALES AND DISTRIBUTION
INTEGRATED MARKETING COMMUNICATIONS
RETAILING MANAGEMENT
SERVICES MARKETING
INTERNATIONAL MARKETING
<b>FINANCE ELECTIVES</b>
STRATEGIC MANAGEMENT ACCOUNTING
SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT
FINANCIAL INSTITUTIONS, MARKETS & SERVICES
STRATEGIC INVESTMENT AND FINANCING DECISIONS
INTERNATIONAL FINANCIAL MANAGEMENT
FINANCIAL DERIVATIVES
<b>HR ELECTIVES</b>
PERFORMANCE MANAGEMENT
TRAINING AND DEVELOPMENT
MANAGEMENT OF INDUSTRIAL RELATIONS
COMPENSATION & REWARD MANAGEMENT
INTERNATIONAL HUMAN RESOURCE MANAGEMENT
LEADERSHIP & CHANGE MANAGEMENT
<b>SYSTEMS ELECTIVES</b>
BUSINESS INTELLIGENCE
DATABASE MANAGEMENT SYSTEMS
DECISION SUPPORT SYSTEMS
E-BUSINESS
KNOWLEDGE MANAGEMENT
INFORMATION SYSTEMS, CONTROL AND AUDIT

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**MASTER OF BUSINESS ADMINISTRATION (MBA) R17**  
 Effective from Academic Year 2017 - 18 admitted batch

**COURSE STRUCTURE AND SYLLABUS**

**I Semester**

Course Code	Course Title	Int. marks	Ext. marks	L	T	P	C
17MBA01	Management and Organisational Behaviour	25	75	3	1	0	4
17MBA02	Business Economics	25	75	3	1	0	4
17MBA03	Financial Accounting & Analysis	25	75	3	1	0	4
17MBA04	Business Statistics	25	75	3	1	0	4
17MBA05	Business Law and Ethics	25	75	3	1	0	4
OPEN ELECTIVE-I 17MBA06	6A Business Research Methodology 6B Project Management 6C Technology Management 6D Rural Marketing	25	75	3	0	0	3
17MBA07	Business Communication - Lab	100	-	0	0	3	2
<b>TOTAL</b>		<b>250</b>	<b>450</b>	<b>18</b>	<b>5</b>	<b>3</b>	<b>25</b>

**II Semester**

Course Code	Course Title	Intl marks	Ext marks	L	T	P	C
17MBA08	Human Resource Management	25	75	3	1	0	4
17MBA09	Marketing Management	25	75	3	1	0	4
17MBA10	Financial Management	25	75	3	1	0	4
17MBA11	Quantitative Analysis for Business Decisions	25	75	3	1	0	4
17MBA12	Entrepreneurship	25	75	3	1	0	4
OPEN ELECTIVE-II 17MBA13	13A Total Quality Management 13B Corporate Governance 13C International Business 13D Supply Chain Management	25	75	3	0	0	3
17MBA14	Summer Internship	100	-	0	0	3	2
<b>TOTAL</b>		<b>250</b>	<b>450</b>	<b>18</b>	<b>5</b>	<b>3</b>	<b>25</b>

**III Semester**

Course Code	Course Title	Intl marks	Ext marks	L	T	P	C
17MBA15	Production & Operations Management	25	75	3	1	0	4
17MBA16	Management Information Systems	25	75	3	1	0	4
17MBA17	Data Analytics	25	75	3	1	0	4

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17MBA18 M1/H1/F1/E1	(MRKG/HRM/FIN/ Entrepreneurship)	25	75	3	0	0	3
17MBA19 M2/H2/F2/E2	(MRKG/HRM/FIN/ Entrepreneurship)	25	75	3	0	0	3
17MBA20 M3/H3/F3/E3	(MRKG/HRM/FIN/ Entrepreneurship)	25	75	3	0	0	3
<b>TOTAL</b>		<b>150</b>	<b>450</b>	<b>18</b>	<b>3</b>	<b>0</b>	<b>21</b>

#### IV Semester

Course Code	Course Title	Intl marks	Ext marks	L	T	P	C
17MBA21	Strategic Management	25	75	3	1	0	4
17MBA22 M4/H4/F4/E4	(MRKG/HRM/FIN/ Entrepreneurship)	25	75	3	0	0	3
17MBA23 M5/H5/F5/E5	(MRKG/HRM/FIN/ Entrepreneurship)	25	75	3	0	0	3
17MBA24 M6/H6/F6/E6	(MRKG/HRM/FIN/ Entrepreneurship)	25	75	3	0	0	3
17MBA25	Pre Submission of Project Work	100	-	0	1	1	1
17MBA26	Comprehensive Viva-Voce	-	100	0	1	1	1
17MBA27	Main Project Viva-Voce	-	100	0	0	5	2
<b>TOTAL</b>		<b>200</b>	<b>500</b>	<b>12</b>	<b>3</b>	<b>7</b>	<b>17</b>

#### LIST OF ELECTIVE SUBJECTS

Students have to select any One Specialization (Marketing, Finance, Human Resources, and Entrepreneurship) and he/she needs to select the Core Elective subjects listed under the chosen specialization only.

Course Code	MARKETING	Credits
17MBA18 M1	Digital Marketing	3
17MBA19 M2	Advertising and Sales Management	3
17MBA20 M3	Consumer Behaviour	3
17MBA22M4	Customer Relationship Management	3
17MBA23M5	International Marketing	3
17MBA24M6	Marketing of Services	3
<b>FINANCE</b>		
17MBA18F1	Security Analysis and Portfolio Management	3
17MBA19F2	Financial Institutions, Markets & Services	3
17MBA20F3	Strategic Management Accounting	3
17MBA22F4	International Financial Management	3
17MBA23F5	Strategic Investment and Financing Decisions	3
17MBA24F6	Risk Management	3
<b>HUMAN RESOURCES</b>		
17MBA18H1	Performance Management Systems	3
17MBA19H2	Learning and Development	3

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17MBA20H3	Management of Industrial Relations	3
17MBA22H4	International Human Resource Management	3
17MBA23H5	Leadership and Change Management	3
17MBA24H6	Talent and Knowledge Management	3
	<b>ENTREPRENEURSHIP</b>	
17MBA18E1	Start up Management	3
17MBA19E2	MSME Management	3
17MBA20E3	Family Business Management	3
17MBA22E4	Entrepreneurial Finance	3
17MBA23E5	Entrepreneurial Marketing	3
17MBA24E6	Creativity Innovation and Entrepreneurship	3

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**MASTER OF BUSINESS ADMINISTRATION MBA (Regular) R-19**  
**Effective from Academic Year 2019 - 20 Admitted Batch**

**COURSE STRUCTURE AND SYLLABUS**

**I Year I Semester**

Course Code	Course Title	L	T	P	Credits
19MBA01	Management and Organizational Behaviour	3	1	0	4
19MBA02	Business Economics	3	1	0	4
19MBA03	Financial Accounting & Analysis	3	1	0	4
19MBA04	Research Methodology and Statistical Analysis	3	1	0	4
19MBA05	Legal and Business Environment	3	1	0	4
Open Elective-I 19MBA06	6A Business Ethics and Corporate Governance 6B Project Management 6C Technology Management 6D Cross Cultural Management	3	0	0	3
19MBA07	Business Communication Lab.	0	0	2	2
19MBA08	Statistical Data Analysis Lab	0	0	2	2
	<b>TOTAL</b>	<b>18</b>	<b>5</b>	<b>4</b>	<b>27</b>

**I Year II Semester**

Course Code	Course Title	L	T	P	Credits
19MBA09	Human Resource Management	3	1	0	4
19MBA10	Marketing Management	3	1	0	4
19MBA11	Financial Management	3	1	0	4
19MBA12	Quantitative Analysis for Business Decisions	3	1	0	4
19MBA13	Entrepreneurship	3	1	0	4
19MBA14	Logistics & Supply Chain Management	3	1	0	4
Open Elective-II 19MBA15	15A Total Quality Management 15B Marketing Research 15C International Business 15D Rural Marketing	3	0	0	3
	<b>TOTAL</b>	<b>21</b>	<b>6</b>	<b>0</b>	<b>27</b>

**Internship during Summer vacation (after Semester –II)**

**II Year I Semester**

Course Code	Course Title	L	T	P	Credits
19MBA16	Production & Operations Management	3	1	0	4
19MBA17	Management Information Systems	3	1	0	4
19MBA18	Data Analytics	3	1	0	4
19MBA19 M1/H1/F1/E1	(MRKG/HRM/FIN/ENTP)	3	1	0	4
19MBA20 M2/H2/F2/E2	(MRKG/HRM/FIN/ENTP)	3	1	0	4
19MBA21 M3/H3/F3/E3	(MRKG/HRM/FIN/ENTP)	3	1	0	4

19MBA22	Summer Internship	0	0	0	2
	<b>TOTAL</b>	<b>18</b>	<b>6</b>	<b>3</b>	<b>26</b>

**II Year II Semester**

Course Code	Course Title	L	T	P	Credits
19MBA 23	Strategic Management	3	1	0	4
19MBA 24 M4/H4/F4/E4	(MRKG/HRM/FIN/ENTP)	3	1	0	4
19MBA25 M5/H5/F5/E5	(MRKG/HRM/FIN/ENTP)	3	1	0	4
19MBA26 M6/H6/F6/E6	(MRKG/HRM/FIN/ENTP)	3	1	0	4
19MBA27	Pre-submission project Seminar	0	0	2	2
19MBA28	Main Project Viva-Voce	0	2	4	4
	<b>TOTAL</b>	<b>12</b>	<b>6</b>	<b>6</b>	<b>22</b>

**LIST OF ELECTIVE SUBJECTS**

Students have to select any One Specialization (Marketing, Finance, Human Resources, and Entrepreneurship) and he/she needs to select the Core Elective subjects listed under the chosen specialization only.

Course Code	Specialization	Credits
	<b>MARKETING</b>	
19MBA19M1	Digital Marketing	4
19MBA20 M2	Advertising and Sales Management	4
19MBA21 M3	Consumer Behaviour	4
19MBA24 M4	Customer Relationship Management	4
19MBA25 M5	International Marketing	4
19MBA26 M6	Services Marketing	4
	<b>FINANCE</b>	
19MBA19F1	Security Analysis and Portfolio Management	4
19MBA20 F2	Financial Institutions, Markets & Services	4
19MBA21 F3	Strategic Management Accounting	4
19MBA24 F4	International Financial Management	4
19MBA25 F5	Strategic Investment and Financing Decisions	4
19MBA26F6	Risk Management and Financial Derivatives	4
	<b>HUMAN RESOURCES</b>	
19MBA19H1	Performance Management Systems	4
19MBA20 H2	Learning and Development	4
19MBA21 H3	Management of Industrial Relations	4
19MBA24 H4	International Human Resource Management	4
19MBA25H5	Leadership and Change Management	4
19MBA26 H6	Talent and Knowledge Management	4
	<b>ENTREPRENEURSHIP</b>	
19MBA19E1	Startup Management	4
19MBA20 E2	MSME Management	4
19MBA21 E3	Family Business Management	4
19MBA24E4	Entrepreneurial Finance	4
19MBA25 E5	Entrepreneurial Marketing	4
19MBA26 E6	Creativity, Innovation and Entrepreneurship	4



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**M. TECH. (ELECTRICAL POWER SYSTEMS/POWER ENGINEERING AND ENERGY SYSTEMS/  
 POWER SYSTEM CONTROL AND AUTOMATION/ ELECTRICAL POWER ENGINEERING)**  
**COURSE STRUCTURE AND SYLLABUS**

I Year – I Semester		Int. marks	Ext. marks	L	P	C
Category	Course Title					
Core Course I	Advanced Power System Analysis	25	75	4	--	4
Core Course II	Advanced Power System Protection	25	75	4	--	4
Core Course III	Modern Control Theory	25	75	4	--	4
Core Elective I	1 EHV AC Transmission 2 High Voltage Engineering 3 Advanced Digital Signal Processing	25	75	4	--	4
Core Elective II	1 Power Quality 2 Microcontrollers and applications 3 Distribution Automation	25	75	4	--	4
Open Elective I	1 Optimization Techniques 2 Digital control systems 3 Renewable energy systems 4 HVDC Transmission 5 Analysis of power converters 6 Embedded Systems	25	75	4	--	4
Laboratory I	Power Systems Lab-I ✓	25	75	--	4	2
Seminar I	Seminar-I ✓	50	--	--	4	2
<b>Total Credits</b>				<b>24</b>	<b>8</b>	<b>28</b>

I Year – II Semester		Int. marks	Ext. marks	L	P	C
Category	Course Title					
Core Course IV	Power System Dynamics	25	75	4	--	4
Core Course V	Flexible AC Transmission Systems (FACTS)	25	75	4	--	4
Core Course VI	Power System Operation and Deregulation	25	75	4	--	4
Core Elective III	1 Gas Insulated Systems(GIS) 2 Programmable Logic Controllers and their applications 3 High frequency magnetic components	25	75	4	--	4
Core Elective IV	1 Reactive Power Compensation and Management 2 Power System Reliability 3 Voltage Stability	25	75	4	--	4
Open Elective II	1 Instrumentation & Control 2 Intelligent Control 3 Smart grid technologies 4 AI Techniques in Electrical Engineering 5 Reliability Engineering 6 Energy Auditing, Conservation & Management	25	75	4	--	4
Laboratory II	Power Systems Lab-II ✓	25	75	--	4	2
Seminar II	Seminar-II ✓	50	--	--	4	2
<b>Total Credits</b>				<b>24</b>	<b>8</b>	<b>28</b>

II Year - I Semester		Int. marks	Ext. marks	L	P	C
Course Title						
Comprehensive Viva-Voce		--	100	--	--	4
Project work Review I		50	--	--	24	12
<b>Total Credits</b>					<b>24</b>	<b>16</b>

II Year - II Semester		Int. marks	Ext. marks	L	P	C
Course Title						
Project work Review II		50	--	--	8	4
Project Evaluation (Viva-Voce)		--	150	--	16	12
<b>Total Credits</b>					<b>24</b>	<b>16</b>

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. TECH. (POWER ENGINEERING & ENERGY SYSTEMS)  
EFFECTIVE FROM ACADEMIC YEAR 2017- 18 ADMITTED BATCH

COURSE STRUCTURE AND SYLLABUS

I Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-1	Advanced Power System Analysis	25	75	4	0	0	4
PC-2	Advanced Power System Protection	25	75	4	0	0	4
PC-3	Renewable Energy Technologies	25	75	4	0	0	4
PE-1	1. EHV AC Transmission 2. High Voltage Engineering 3. Advanced Digital Signal Processing	25	75	3	0	0	3
PE-2	1. Power Quality 2. Microcontrollers and applications 3. Distribution Automation	25	75	3	0	0	3
OE-1	*Open Elective – I	25	75	3	0	0	3
Laboratory I	Power and Energy Systems Lab-I ✓	25	75	0	0	3	2
Seminar I	Seminar –I	100	0	0	0	3	2
<b>Total</b>		<b>275</b>	<b>525</b>	<b>21</b>	<b>0</b>	<b>6</b>	<b>25</b>

II Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-4	Modern Control Theory	25	75	4	0	1	4
PC-5	Flexible AC Transmission Systems (FACTS)	25	75	4	0	1	4
PC-6	Smart Grid Technologies	25	75	4	0	1	4
PE-3	1. Energy Auditing Conservation and Management 2. Programmable Logic Controllers and their applications 3. High Frequency Magnetic Components	25	75	3	0	0	3
PE4	1. Reactive Power Compensation and Management 2. Power System Reliability 3. Voltage Stability	25	75	3	0	0	3
OE-2	*Open Elective – II	25	75	3	0	0	3
Laboratory II	Power and Energy Systems Lab-II	25	75	0	0	3	2
Seminar II	Seminar –II ✓	100	0	0	0	3	2
<b>Total</b>		<b>275</b>	<b>525</b>	<b>21</b>	<b>0</b>	<b>6</b>	<b>25</b>

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### III Semester

Course Title	Int marks	Ext. marks	L	T	P	C
Technical Paper Writing	100	0	0	3	0	2
Comprehensive Viva-Voce	0	100	0	0	0	4
Project work Review I	100	0	0	0	22	8
<b>Total</b>	<b>200</b>	<b>100</b>	<b>0</b>	<b>3</b>	<b>22</b>	<b>14</b>

### IV Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Project work Review II	100	0	0	0	24	8
Project Evaluation (Viva-Voce)	0	200	0	0	0	16
<b>Total</b>	<b>100</b>	<b>200</b>	<b>0</b>	<b>0</b>	<b>24</b>	<b>24</b>

\*Open Elective subjects must be chosen from the list of open electives offered by OTHER departments.

# For Project review I, please refer 7.10 in R17 Academic Regulations.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**M. TECH. POWER ENGINEERING AND ENERGY SYSTEMS**  
**EFFECTIVE FROM ACADEMIC YEAR 2019- 20 ADMITTED BATCH**

**R19 COURSE STRUCTURE AND SYLLABUS**

**I YEAR I SEMESTER**

Course Code	Course Title	L	T	P	Credits
Professional Core - I	Economic Operation of Power Systems	3	0	0	3
Professional Core - II	Renewable Energy Technologies	3	0	0	3
Professional Elective - I	1. Engineering Heat Transfer 2. Thermal Power Plant 3. Smart Grid Technologies 4. Modern Control Theory	3	0	0	3
Professional Elective - II	1. Electrical Power Distribution System 2. Reactive Power Compensation and Management 3. Mathematical Methods for Power Engineering 4. Hybrid Electric Vehicles	3	0	0	3
	Research Methodology and IPR	2	0	0	2
Lab - I	Power and Energy Systems Lab - ✓	0	0	4	2
Lab - II	Energy Computational Lab ✓	0	0	4	2
Audit - I	Audit Course - I	2	0	0	0
	<b>Total</b>	<b>16</b>	<b>0</b>	<b>8</b>	<b>18</b>

**I YEAR II SEMESTER**

Course Code	Course Title	L	T	P	Credits
Professional Core - III	Digital Protection of Power System	3	0	0	3
Professional Core - IV	Energy Efficiency in Thermal Systems	3	0	0	3
Professional Elective - III	1. Restructured Power Systems 2. Nuclear Power Plants 3. Swarm Intelligence Techniques in Power Systems 4. Industrial Load Modelling and Control	3	0	0	3
Professional Elective - IV	1. AI Techniques in Power Systems 2. Wind Energy Conversion Systems 3. Optimization of Energy Systems 4. Power System Reliability and Planning	3	0	0	3
	Mini Project with Seminar	0	0	4	2
Lab - III	Power and Energy Systems Lab - II ✓	0	0	4	2
Lab - IV	Power System Protection Lab ✓	0	0	4	2
Audit - II	Audit Course - II	2	0	0	0
	<b>Total</b>	<b>14</b>	<b>0</b>	<b>12</b>	<b>18</b>

**II YEAR I SEMESTER**

Course Code	Course Title	L	T	P	Credits
Professional Elective - V	1 Hydrogen Fuel Cells	3	0	0	3
	2 Flexible AC Transmission Systems				
	3 Gas Insulated Systems				
	4 SCADA System and Applications				
Open Elective	Open Elective	3	0	0	3
Dissertation	Dissertation Work Review - II	0	0	12	6
<b>Total</b>		<b>6</b>	<b>0</b>	<b>12</b>	<b>12</b>

**II YEAR II - SEMESTER**

Course Code	Course Title	L	T	P	Credits
Dissertation	Dissertation Work Review - III	0	0	12	6
Dissertation	Dissertation Viva-Voce	0	0	28	14
<b>Total</b>		<b>0</b>	<b>0</b>	<b>40</b>	<b>20</b>

\* For Dissertation Work Review - I, Please refer 7.8 in R19 Academic Regulations.

**Audit Course I & II:**

- 1 English for Research Paper Writing
- 2 Disaster Management
- 3 Sanskrit for Technical Knowledge
- 4 Value Education
- 5 Constitution of India
- 6 Pedagogy Studies
- 7 Stress Management by Yoga
- 8 Personality Development through Life Enlightenment Skills

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**M. Tech in ADVANCED MANUFACTURING SYSTEMS**  
Effective from Academic Year 2017- 18 admitted batch

**COURSE STRUCTURE AND SYLLABUS**

**I Semester**

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-1	Automation in Manufacturing	25	75	4	0	0	4
PC-2	Computer Aided Manufacturing	25	75	4	0	0	4
PC-3	Theory of Metal Cutting	25	75	4	0	0	4
PE-1	1. Design For Manufacturing and Assembly 2. Special Manufacturing Process 3. Product Data Management	25	75	3	0	0	3
PE-2	1. Advanced Mechatronics 2. Precision Engineering 3. Rapid Prototyping Technologies	25	75	3	0	0	3
OE-1	<b>*Open Elective –I</b>	25	75	3	0	0	3
Laboratory I	Advanced CAD/CAM Lab	25	75	0	0	3	2
Seminar I	Seminar-I	100	0	0	0	3	2
<b>Total</b>		<b>275</b>	<b>525</b>	<b>21</b>	<b>0</b>	<b>6</b>	<b>25</b>

**II Semester**

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-4	Performance Modeling & Analysis of Manufacturing Systems	25	75	4	0	0	4
PC-5	Materials Technology	25	75	4	0	0	4
PC-6	Manufacturing Systems: Simulation Modeling & Analysis	25	75	4	0	0	4
PE-3	1. Quality Engineering in manufacturing 2. Industrial Robotics 3. Advanced Tool Design	25	75	3	0	0	3
PE4	1. Total Quality Management 2. Vibration Analysis & Condition Monitoring 3. Concurrent Engineering & Product life cycle Management	25	75	3	0	0	3
OE-2	<b>*Open Elective - II</b>	25	75	3	0	0	3
Laboratory II	Manufacturing Simulation & Precision Engineering Lab	25	75	0	0	3	2
Seminar II	Seminar-II	100	0	0	0	3	2
<b>Total</b>		<b>275</b>	<b>525</b>	<b>21</b>	<b>0</b>	<b>6</b>	<b>25</b>

### III Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Technical Paper Writing	100	0	0	3	0	2
Comprehensive Viva-Voce	0	100	0	0	0	4
Project work Review II	100	0	0	0	22	8
<b>Total</b>	<b>200</b>	<b>100</b>	<b>0</b>	<b>3</b>	<b>22</b>	<b>14</b>

### IV Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Project work Review III	100	0	0	0	24	8
Project Evaluation (Viva-Voce)	0	100	0	0	0	16
<b>Total</b>	<b>100</b>	<b>100</b>	<b>0</b>	<b>0</b>	<b>24</b>	<b>24</b>

\*Open Elective subjects must be chosen from the list of open electives offered by **OTHER** departments.

# For Project review I, please refer 7.10 in R17 Academic Regulations.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**M. Tech – I Year – II Sem. (AMS)**

**PERFORMANCE MODELING AND ANALYSIS OF MANUFACTURING SYSTEMS**  
**(Professional Core – 4)**

**UNIT - I:**

**Manufacturing Systems & Control:**

Automated Manufacturing Systems – Modeling – Role of performance modeling – simulation models- Analytical models. Product cycle – Manufacturing automation – Economics of scale and scope – input/output model – plant configurations. Performance measures – Manufacturing lead time – Work in process – Machine utilization – Throughput – Capacity – Flexibility – Performability – Quality Control Systems – Control system architecture – Factory communications – Local area network interconnections – Manufacturing automation protocol – Database management system.

**UNIT - II:**

**Manufacturing Processes:**

Examples of stochastics processes – Poisson process - Discrete time Markov chain models – Definition and notation – Sojourn times in states – Examples of DTMCs in manufacturing – Chapman – Kolmogorov equation – Steady-state analysis. Continuous Time Markov Chain Models – Definitions and notation – Sojourn times in states – examples of CTMCs in manufacturing – Equations for CTMC evolution – Markov model of a transfer line. Birth and Death Processes in Manufacturing – Steady state analysis of BD Processes – Typical BD processes in manufacturing.

**UNIT - III:**

**Queuing Model:**

Notation for queues – Examples of queues in manufacturing systems – Performance measures – Little's result – Steady state analysis of M/M/m queue, queues with general distributions and queues with breakdowns – Analysis of a flexible machine center.

**UNIT - IV:**

**Queuing Networks:**

Examples of QN models in manufacturing – Little's law in queuing networks – Tandem queue – An open queuing network with feedback – An open central server model for FMS – Closed transfer line – Closed server model – Garden Newell networks.

**UNIT - V:**

**Petrinets:**

Classical Petri Nets – Definitions – Transition firing and reachability – Representational power – properties – Manufacturing models.  
Stochastic Petri Nets – Exponential timed Petri Nets – Generalized Stochastic Petri Nets – modeling of KANBAN systems – Manufacturing models.

**REFERENCES:**

1. Performance Modelling of Automated Manufacturing Systems/ Viswanadham, N and Narahari, Y/ Prentice Hall of India, New Delhi, 1994
2. Probability and Statistics with Reliability, Queuing and Computer Science Applications/ Trivedi, K. S./ Prentice Hall, New Jersey, 1982.
3. Fundamentals of Mathematical Statistics/ Gupta S.C. & Kapoor V. K./ 3rd Edition, Delhi, 1988



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**M. Tech – I Year – II Sem. (AMS)**

**MATERIALS TECHNOLOGY**  
**(Professional Core – 5)**

**UNIT - I:**

Elasticity in metals and polymers, mechanism of plastic deformation, role of dislocations, yield stress, shear strength of perfect and real crystals, strengthening mechanism, work hardening, solid solution, grain boundary strengthening. Poly phase mixture, precipitation, particle, fiber and dispersion strengthening, effect of temperature, strain and strain rate on plastic behavior, super plasticity, deformation of non crystalline material

**UNIT - II:**

Griffith's Theory, stress intensity factor and fracture Toughness, Toughening Mechanisms, Ductile and Brittle transition in steel, High Temperature Fracture, Creep, Larson – Miller parameter, Deformation and Fracture mechanism maps.

**UNIT - III:**

Fatigue, Low and High cycle fatigue test, Crack Initiation and Propagation mechanism and Paris Law, Effect of surface and metallurgical parameters on Fatigue, Fracture of non-metallic materials, fatigue analysis, Sources of failure, procedure of failure analysis.

**UNIT - IV:**

Motivation for selection, cost basis and service requirements, Selection for Mechanical Properties, Strength, Toughness, Fatigue and Creep. Selection for Surface durability, Corrosion and Wear resistance, Relationship between Materials Selection and Processing, Case studies in Materials Selection with relevance to Aero, Auto, Marine, Machinery and Nuclear Applications.

**UNIT - V:**

**Modern Metallic Materials:** Dual Steels, Micro alloyed, High Strength Low alloy (HSLA) Steel, Transformation induced plasticity (TRIP) Steel, Maraging Steel, Inter metallics, Ni and Ti Aluminides, Smart Materials, Shape Memory alloys, Metallic Glass Quasi Crystal and Nano Crystalline Materials.

**Nonmetallic Materials:** Polymeric materials and their molecular structures, Production Techniques for Fibers, Foams, Adhesives and Coatings, structure, Properties and Applications of Engineering Polymers, Advanced Structural Ceramics WC, TiC, TaC, Al<sub>2</sub>O<sub>3</sub>, SiC, Si<sub>3</sub>N<sub>4</sub>, CBN and Diamond – properties, Processing and applications.

**REFERENCES:**

1. Mechanical Behavior of Materials/Thomas H. Courtney/ McGraw Hill/2nd Edition/2000
2. Mechanical Metallurgy/George E. Dieter/McGraw Hill, 1998.
3. Selection and use of Engineering Materials 3e/Charles J.A/Butterworth Heiremann.
4. Engineering Materials Technology/James A Jacob Thomas F Kilduff/Pearson
5. Material Science and Engineering/William D Callister/John Wiley and Sons

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**M. Tech – I Year – II Sem. (AMS)**

**MANUFACTURING SYSTEMS: SIMULATION MODELLING AND ANALYSIS**  
**(Professional Core – 6)**

**Pre-requisites:** Operations Research, Optimization Techniques and Applications and Probability Statistics

**Course Outcomes:** After doing this course, a student should be able to

- Identify a type of system based on type of its dynamics, ways of analyzing system
- Develop simulation model for dynamic discrete-event stochastic system and analyze for specified steady-state performance measures

**UNIT - I:**

System – ways to analyze the system – Model - types of models – Simulation – Definition – Types of simulation models – steps involved in simulation – Advantages & Disadvantages. Parameter estimation – estimator – properties – estimate – point estimate – confidence interval estimates – independent – dependent – hypothesis – types of hypothesis- steps – types 1 & 2 errors – Framing – strong law of large numbers.

**UNIT - II:**

Building of Simulation model – validation – verification – credibility – their timing – principles of valid simulation Modeling – Techniques for verification – statistical procedures for developing credible model. Modeling of stochastic input elements – importance – various procedures – theoretical distribution – continuous – discrete – their suitability in modeling.

**UNIT - III:**

Generation of random variates – factors for selection – methods – inverse transform – composition – convolution – acceptance – rejection – generation of random variables – exponential – uniform – weibull – normal Bernoulli – Binomial – uniform – poisson. Simulation languages – comparison of simulation languages with general purpose languages – Simulation languages vs Simulators – software features – statistical capabilities – G P S S – SIMAN- SIMSCRIPT –Simulation of M/M/1 queue – comparison of simulation languages.

**UNIT - IV:**

Output data analysis – Types of Simulation w.r.t output data analysis – warmup period- Welch algorithm – Approaches for Steady – State Analysis – replication – Batch means methods – comparisons

**UNIT –V:**

Applications of Simulation – flow shop system – job shop system – M/M/1 queues with infinite and finite capacities – Simple fixed period inventory system – Newboy paper problem.

**REFERENCES:**

1. Simulation Modelling and Analysis / Law, A.M. & Kelton / McGraw Hill, 2<sup>nd</sup> Edition, New York, 1991.
2. Discrete Event System Simulation / Banks J. & Carson J.S., PH / Englewood Cliffs, NJ, 1984.
3. Simulation of Manufacturing Systems / Carrie A. / Wiley, NY, 1990.
4. A Course in Simulation / Ross, S.M., McMillan, NY, 1990.  
Simulation Modelling and SIMNET / Taha H.A / PH, Englewood Cliffs, NJ, 1987

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**M. Tech – I year II Sem. (AMS)**

**QUALITY ENGINEERING IN MANUFACTURING**  
**(Professional Elective – 3)**

**UNIT - I**

**Quality Value and Engineering:** An overall quality system, quality engineering in production design, quality engineering in design of production processes. Loss Function and Quality Level: Derivation and use of quadratic loss function, economic consequences of tightening tolerances as a means to improve quality, evaluations, and types tolerances. (N-type, S-type and L-type)

**UNIT - II**

**Tolerance Design and Tolerancing:** Functional limits, tolerance design for N-type, L-type and S-type characteristics, tolerance allocation for multiple components. Parameter and Tolerance Design: Introduction to parameter design, signal to noise ratios, Parameter design strategy, some of the case studies on parameter and tolerance designs.

**UNIT – III**

**Analysis of Variance (ANOVA):** Introduction to ANOVA, Need for ANOVA, NO-way ANOVA, One-way ANOVA, Two-way ANOVA, Critique of F-test, ANOVA for four level factors, multiple level factors.

**UNIT - IV**

**Orthogonal Arrays:** Typical test strategies, better test strategies, efficient test strategies, steps in designing, conducting and analyzing an experiment. Interpolation of Experimental Results: Interpretation methods, percent contributor, estimating the mean.

**UNIT - V**

**Six Sigma and the Technical System:** Six sigma DMAIC methodology, tools for process improvement, six sigma in services and small organizations, statistical foundations, statistical methodology.

**REFERENCES:**

1. Taguchi Techniques for Quality Engineering / Phillip J. Ross / McGraw Hill/ Intl. II Edition, 1995.
2. Quality Engineering in Production systems / G. Taguchi, A. Elsayed et al / Mc.Graw Hill Intl. Edition, 1989.
3. Taguchi Methods explained: Practical steps to Robust Design / Papan P. Bagchi / Prentice Hall Pvt. Ltd., New Delhi.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**M. Tech – I year II Sem. (AMS)**

**INDUSTRIAL ROBOTICS**  
**(Professional Elective – 3)**

**UNIT - I**

**Introduction:** Automation and Robotics, Robot anatomy, robot configuration, motions joint notation work volume, robot drive system, control system, and dynamic performance, precision of movement.

**Control System and Components:** basic concept and modais controllers control system analysis, robot activation and feedback components. Positions sensors, velocity sensors, actuators sensors, power transmission system.

**UNIT - II**

**Motion Analysis and Control:** Manipulator kinematics, position representation forward transformation, homogeneous transformation, manipulator path control, robot dynamics, configuration of robot controller.

**UNIT - III**

**End Effectors:** Grippers-types, operation, mechanism, force analysis, tools as end effectors consideration in gripper selection and design. **SENSORS:** Desirable features, tactile, proximity and range sensors, uses sensors in robotics.

**Machine Vision:** Functions, Sensing and Digitizing-imaging, Devices, Lighting techniques, Analog to digital single conversion, image storage, Image processing and Analysis-image data reduction, Segmentation feature extraction. Object recognition, training the vision system, Robotics application.

**UNIT - IV**

**Robot Programming:** Lead through programming, Robot programming as a path in space, Motion interpolation, WAIT, SINONAL AND DELAY commands, Branching capabilities and Limitations.

**Robot Languages:** Textual robot Languages, Generation, Robot language structures, Elements in function.

**UNIT - V**

**Robot Cell DESGIN AND CONTROL:** Robot cell layouts-Robot centered cell, In-line robot cell, Considerations in work design, Work and control, Inter locks, Error detect ion, Work wheel controller.

**Robot Application:** Material transfer, Machine loading/unloading. Processing operation, Assembly and Inspection, Feature Application.

**REFERENCES:**

1. Industrial Robotics / Groover M P /Pearson Edu.
2. Introduction to Robotic Mechanics and Control by JJ Craig, Pearson, 3rd edition.
3. Robotics / Fu K S/ McGraw Hill.
4. Robotic Engineering / Richard D. Klafter, Prentice Hall
5. Robot Analysis and Intelligence / Asada and Slotine / Wiley Inter-Science.
6. Robot Dynamics & Control – Mark W. Spong and M. Vidyasagar / John Wiley & Sons (ASIA) Pvt. Ltd.
7. Robotics and Control / Mittal R K & Nagrath I J / TMH
8. Industrial Automation and robotics, Er. A. K. Gupta and S. K. Arora, University Science Press, 2014.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**M. Tech – I year II Sem. (AMS)**

**ADVANCED TOOL DESIGN**  
**(Professional Elective – 3)**

**UNIT – I:**

**Tool Materials:**

Properties of materials: Tool steels, Cast Iron, Mild or low carbon steels, Non metallic and nonferrous materials, Heat treating

**UNIT – II:**

**Design of Cutting Tools:**

Single Point cutting tools: Milling cutters, Drills, Selection of carbide steels – Determination of shank size for single point carbide tools, Determining the insert thickness for carbide tools

**UNIT – III:**

**Design of Jigs and Fixtures:**

Basic principles of location and clamping: Locating methods and devices, Jigs-Definition Types, General considerations in the design of Drill jigs, Drill bushing, Methods of Construction. Fixtures-Vice fixtures, Milling, Boring Lathe Grinding fixtures.

**UNIT – IV:**

**Design of Sheet Metal Blanking and Piercing Dies:**

Fundamentals of Die cutting operation, Power press types, General press information, Materials Handling equipment. Cutting action in Punch and die operations. Die clearance, Types of Die construction. Die design fundamentals-Blanking and piercing die construction, pilots, stripper and pressure pads presswork material, Strip layout, Short run tooling for piercing.

**UNIT – V:**

**Design of Sheet Metal Bending, Forming and Drawing Dies:**

Bending dies, drawing dies, forming dies, drawing operations, Variables that effect metal flow during drawing. Determination of blank size, Drawing force, Single, and double action draw dies.

**REFERENCES:**

1. Donaldson "Tool Design"/ Tata McGraw Hill
2. Production Technology/HMT/Tata McGraw Hill/
3. Production Technology by R.K. Jain and S.C. Gupta.
4. Mechanical Metallurgy/ George F Dieter/ Tata McGraw Hill
5. Machine Tools/C Elanchezhian & M. Vijayan/Anuradha Publications
6. Principles of Machine Tools, Bhattacharya A and Sen. G. C. New Central Book Agency
7. Hand Book of Metal forming/ Kurt Lange/ Mc Graw-Hill,.1987

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**M. Tech – I year II Sem. (AMS)**

**TOTAL QUALITY MANAGEMENT**  
**(Professional Elective – 4)**

**UNIT – I:**

**Introduction:** The concept of TQM, Quality and Business performance, attitude and involvement of top management, communication, culture and management systems. Management of Process Quality: Definition of quality, Quality Control, a brief history, Product Inspection vs, Process Control, Statistical Quality Control, Control Charts and Acceptance Sampling.

**UNIT – II:**

**Customer Focus and Satisfaction:** The importance of customer satisfaction and loyalty- Crating satisfied customers, Understanding the customer needs, Process Vs. Customer, internal customer conflict, quality focus, Customer Satisfaction, role of Marketing and Sales, Buyer – Supplier relationships. Bench Marketing: Evolution of Bench Marketing, meaning of Bench marketing, benefits of bench marketing, the bench marketing process, pitfalls of bench marketing.

**UNIT – III:**

**Organizing for TQM:** The systems approach, Organizing for quality implementation, making the transition from a traditional to a TQM organizing, Quality Circles. Productivity, Quality and Reengineering: The leverage of Productivity and Quality, Management systems Vs. Technology, Measuring Productivity, Improving Productivity Re-engineering.

**UNIT – IV:**

**The Cost of Quality:** Definition of the Cost of Quality, Quality Costs, Measuring Quality Costs, use of Quality Cost Information, Accounting Systems and Quality Management.

**UNIT – V:**

**ISO9000:** Universal Standards of Quality: ISO around the world, The ISO9000 ANSI/ASQCQ-90. Series Standards, benefits of ISO9000 certification, the third party audit, Documentation ISO9000 and services, the cost of certification implementing the system.

**REFERENCES:**

1. Total Quality Management / Joel E. Ross/Taylor and Franscis Limited
2. Total Quality Management/P.N. Mukherjee/PHI
3. Beyond TQM / Robert L. Flood
4. Statistical Quality Control / E.L. Grant / McGraw Hill.
5. Total Quality Management- A Practical Approach/H. Lal
6. Quality Management/Kanishka Bedi/Oxford University Press/2011
7. Total Engineering Quality Management/Sunil Sharma/Macmillan

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**M. Tech – I year II Sem. (AMS)**

**VIBRATIONAL ANALYSIS AND CONDITION MONITORING**  
**(Professional Elective – 4)**

**UNIT - I**

Causes and effects of vibration, Vibration of single Degree and Multi Degree of freedom systems. Steady state and transient characteristics of Vibration.

**UNIT - II**

Introduction to Condition Monitoring, Failures types, investigation and occurrences. Causes of failure, Characteristics of vibration ~SHM, Periodic motion, Displacement, Velocity and acceleration. Peak to peak & RMS, Linear and logarithmic scales and phase angle.

**UNIT - III**

Vibration measuring instruments, vibration transducers, signal conditioning elements. Display and recording elements. Vibration meters and analyzers.

**UNIT - IV**

Condition monitoring through vibration analysis. Frequency analysis, Filters, Vibration signature of active systems, vibration limits and standards. Contaminant analysis, SOAP and other contaminant monitoring techniques,

**UNIT - V**

Special vibration measuring techniques Change in sound method, Ultrasonic measurement method, Shock pulse measurement, Kurtosis, Acoustic emission monitoring, Cepstrum analysis, Modal analysis, critical speed analysis, shaft -orbit & position analysis..

**REFERENCES:**

1. Mechanical Fault Diagnosis and Condition Monitoring/ Collacott. R.A./ Chapman & Hall, London, 1982,
2. Introduction to Machinery Analysis and Monitoring/ John S. Mitchell/ Perm Well Books, Perm Well Publishing Company, Tulsa, Oklahoma,1993,
3. Vibration Measurement and Analysis/ Nakra. B. C .Yadava, G. S. and Thuested .L. / National Productivity Council, New Delhi, 1989.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**M. Tech – I year II Sem. (AMS)**

**CONCURRENT ENGINEERING AND PRODUCT LIFE CYCLE MANAGEMENT**  
**(Professional Elective – 4)**

**UNIT - I:**

**Introduction:** Extensive definition of Concurrent Engineering(CE), CE design methodologies, Review of CE techniques like DFM (Design for manufacture), DFA(Design for assembly), QFD (Quality function deployment), RP (Rapid prototyping), TD (Total design), for integrating these technologies, organizing for CE, CE tool box, Collaborative product development.

**UNIT - II:**

**Use of Information Technology:** IT Support Solid modeling, product data management, Collaborative product commerce, Artificial Intelligence, expert systems, Software hardware component design.

**UNIT - III:**

**Design Stage:** Lifecycle design of products, opportunities for manufacturing enterprises, Modality of Concurrent engineering design, Automated analysis idealization control, CE in optimal structural design, Real time constraints.

**UNIT - IV:**

**Need for PLM:** Importance of PLM, Implementing of PLM, Responsibility for PLM, Benefits to different managers, Components of PLM, Emergence of PLM, Life cycle problems to resolve, Opportunities to seize.

**UNIT - V:**

**Components of PLM:** components of PLM, Product lifecycle activities, Product organizational structure, Human resources in product lifecycle, Methods, techniques, practices, Methodologies, Processes, System components in lifecycle, slicing and dicing the systems, Interfaces, Information, Standards.

**REFERENCES:**

1. Integrated Product Development / M. M .Anderson and L. Hein/ IFS Publications
2. Design for Concurrent Engineering/ J Cleetus/ CE Research Centre, Morgantown,
3. Concurrent Engineering Fundamentals/ Prasad / Prentice hall India Integrated Product Development
4. Concurrent Engineering in product Design and Development/ I. Moustapha / New age International
5. Product Life Cycle Management/ John Stark/ Springer –Verlag/ UK
6. Product Lifecycle Management/ Michael Grives/ McGraw Hill
7. Concurrent Engineering: Automation tools and Technology/Andrew Kusiak/ Wiley Eastern Technology.



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**M. Tech – I year II Sem. (AMS)**

**MANUFACTURING SIMULATION & PRECISION ENGINEERING LAB**

**A. MANUFACTURING SIMULATION**

The students will be given training on the use and application of the following software to manufacturing problems:

1. Auto MOD Software.
2. PROMODEL
3. SLAM-II
4. CAFIMS
5. Flexsim

They also learn how to write sub routines in C-language and interlinking with the above packages. Problems for modelling and simulation experiments:

1. AGV planning
2. ASRS simulation and performance evaluation
3. Machines, AGVs and AS/RS integrated problems
4. JIT system
5. Kanban flow
6. Material handling systems
7. M.R.P. Problems
8. Shop floor scheduling etc.

**B. PRECISION ENGINEERING**

1. Hydraulic and Pneumatic circuits
2. Closed loop control systems
3. Study of the chip formation in turning process
4. Study of operation of tool and cutter grinder, twist drill grinder, Centreless grinder
5. Determination of cutting forces in turning
6. Experiments in unconventional manufacturing processes-AJM and study of USM, EDM, Laser Machining and Plasma spraying
7. Inspection of parts using tool makers microscope, roughness and form tester
8. Study of micro-controllers, programming on various CNC machine tools and also controllers
9. Studies on PLC programming
10. Study and programming of robots
11. Condition monitoring in machining process using acoustic emission.