



**NAGARJUNA COLLEGE OF ENGINEERING AND TECHNOLOGY**  
**(An Autonomous College Under VTU)**

**1.1.2 Number of all programs offered by Institution during last 5 years**

**Scheme of all Programmes**

<b>Sl.No.</b>	<b>Programme(s)/Year</b>	<b>Page No.</b>
01	(CV,CSE,ECE,ISE,ME,CV-CCT,CV-CSE,MBA)/ 2020-21	<b>02-84</b>
02	Computer Science and Engineering/2019-20,18-19,17-18,16-17	<b>85-130</b>
03	Civil Engineering-UG/2019-20,18-19,17-18,16-17	<b>131-186</b>
04	Electronics and Communication Engineering/2019-20,18-19,17-18,16-17	<b>187-239</b>
05	Information Science and Engineering/2019-20,18-19,17-18,16-17	<b>240-278</b>
06	Mechanical Engineering/2019-20,18-19,17-18,16-17	<b>279-334</b>
07	Construction Technology-PG/2019-20,18-19,17-18,16-17	<b>335-355</b>
08	Structural Engineering-PG/2019-20,18-19,17-18,16-17	<b>356-384</b>
09	Master of Business Administration-PG/2019-20,18-19,17-18,16-17	<b>385-424</b>
10	First Year /2020 -21,2019-20,18-19,17-18,16-17	<b>425-438</b>

**Summary:** Scheme and Syllabus is prepared in consultation with all the stake holders and further it is discussed in Board of Studies (BOS) meeting, approved and ratified by Academic Council and governing body meeting, Syllabus revision and introduction of new courses are discussed during academic year which are to be introduced during the next academic year in presence of experts from industry and academia.

  
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Nagarjuna College of Engineering & Technology  
Devanahalli (Tq) Bengaluru (Dt.)-Pin: 562164



**NAGARJUNA**  
COLLEGE OF ENGINEERING & TECHNOLOGY

**Outcome Based Education(OBE)/  
Choice Based Credit System (CBCS) Curricula**

**2020-2021**

Department of Civil Engineering  
**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
Mudugurki Village, VenkatagiriKote Post,Devanahalli taluk,  
Bangalore district - 562 164

  
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Nagarjuna College of Engineering & Technology  
Devanahalli (Tq) Bengaluru (Dt.)-Pin: 562164



**An Autonomous College under VTU**

## **DEPARTMENT OF CIVIL ENGINEERING**

### **VISION**

To transform the students as leaders in Civil Engineering to achieve professional excellence in the challenging future.

### **MISSION**

**M1:** To provide the Civil Engineering knowledge and skills for students through an excellent academic environment.

**M2:** Adopting innovative teaching techniques using modern engineering tools for designing, modeling and analyzing the societal and environmental problems.

**M3:** Developing Communication skill, leadership qualities through teamwork and skills for continuing education among the students.

**M4:** To inculcate moral, ethical and professional values among students to serve the society.

**M5:** Validate engineering knowledge through innovative research projects to enhance their employability and entrepreneurship skills.

  
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***Scheme and Syllabus With effect from  
Academic Year 2020-21***



## ***Program Outcome (PO)***

### **PO1: Engineering Knowledge:**

Apply the knowledge of mathematics, science, engineering fundamentals and Civil Engineering principles to the solution of complex problems in Civil Engineering.

### **PO2: Problem Analysis**

Identify, formulate, research literature and analyze complex Civil Engineering problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.

### **PO3: Design/Development of Solutions:**

Design solutions for complex Civil Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

### **PO4: Conduct Investigations of Complex problems:**

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions related to Civil Engineering problems.

### **PO5: Modern Tool Usage:**

Create, select, and apply appropriate techniques, resources, and modern engineering tools such as CAD, FEM, GIS, etc. including prediction and modeling to complex Civil Engineering activities with an understanding of the limitations.

### **PO6: The Engineer and Society:**

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Civil Engineering practice.

**PO7: Environment and Sustainability:**

Understand the impact of the professional Civil Engineering solutions in societal and environmental contexts and demonstrate the knowledge and the need for sustainable development.

**PO8: Ethics**

Apply ethical principles and commit to professional ethics and responsibilities while following the Civil Engineering practice.

**PO9: Individual and Team work**

Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.

**PO10: Communication**

Communicate effectively on complex Civil Engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11: Project Management and Finance**

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage Civil Engineering projects and in multidisciplinary environments.

**PO12: Life Long Learning**

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## ***Program Specific Outcome (PSO)***

Program Specific Outcomes (PSOs) are what the graduates of a specific undergraduate engineering program should be able to do at the time of graduation.

**PSO1:** To carryout surveying, prepare layout plans, maps for structures and alignments for canals and roads.

**PSO2:** To specify, analyze, design, estimate and supervise construction activities such as, test and evaluate foundations and superstructures for buildings, industries, irrigation and hydraulic structures, highways, railways, airports, docks and harbors.

**PSO3:** To understand the impact of water, air and noise pollution; the methods of waste collection, disposal and processing; specify, design and analyze water supply system, sewerage and industrial effluent conveying and treatment systems.

  
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### Third Semester B.E. – Scheme

Sl. No.	Course Code		Course Name	Teaching Dept.	Total Credits	L:T:P:S	Marks	Weekly Load
1	BSC	19CVM31	Integral Transforms And Fourier Series	BS	4	3-2-0-0	100	0+5
2	PCC	19CVT32	Strength of Materials	CE	3	3-2-0-0	100	0+5
3	PCC	19CVT33	Fluids Mechanics and Machinery	CE	3	3-2-0-0	100	0+5
4	PCC	19CVT34	Construction Materials, Stores and Inventory Control	CE	3	3-0-0-0	100	0+5
5	PCC	19CVT35	Engineering Surveying	CE	3	2-2-0-0	100	0+4
6	PCC	19CVT36	Engineering Geology	CE	3	3-0-0-0	100	0+3
7	PCC	19CVL37	Building Material Testing Laboratory	CE	2	1-0-2-0	100	0+2
8	HSMC	19CVH38	Universal Human Values	S&H	3	2-0-2-0	100	2+0
9	HSMC	19CVH39	Constitution of India and Professional Ethics	S&H	1	1-0-0-0	100	1+0
<b>TOTAL</b>					<b>25</b>	<b>21:8:6:0</b>	<b>900</b>	<b>3+29</b>

<b>BSC-Basic Science</b>	<b>PCC – Professional Core</b>	<b>PEC – Professional Elective</b>	<b>MEP – Industrial Elective</b>	<b>HSMC – Humanity and Social Science</b>
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<b>L - Lecture</b>	<b>T - Tutorials</b>	<b>P - Practical</b>	<b>S - Self Study</b>
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### Fourth Semester B.E. – Scheme

Sl. No.	Course Code		Course Name	Teaching Dept.	Total Credits	L:T:P:S	Marks	Weekly load
1	BSC	19CVM41	Applied Calculus and Probability Distributions	BS	4	3-2-0-0	100	0+5
2	PCC	19CVT42	Structural Analysis-I	CE	4	3-2-0-0	100	0+5
3	PCC	19CVT43	Advanced Construction Techniques	CE	3	2-2-0-0	100	0+4
4	PCC	19CVT44	Irrigation and Hydraulic Structures	CE	3	3-0-0-0	100	0+4
5	PCC	19CVT45	Geotechnical Engineering	CE	3	3-0-0-0	100	0+5
6	PCC	19CVT46	Environmental Engineering	CE	3	3-0-0-0	100	2+1
7	PCC	19CVL47	Surveying Practice	CE	2	1-0-2-0	100	0+3
8	PCC	19CVL48	Fluids Mechanics and Machinery Lab	CE	2	1-0-2-0	100	0+2
9	HSMC	19CVH49	Aadalitha Kannada and Vyavaharika Kannada	S&H	1	1-0-0-0	100	1+0
<b>TOTAL</b>					<b>25</b>	<b>20:6:4:0</b>	<b>900</b>	<b>3+29</b>
Internship is to be completed before VII Semester								

<b>BSC-Basic Science</b>	<b>PCC – Professional Core</b>	<b>PEC – Professional Elective</b>	<b>MEP – Industrial Elective</b>	<b>HSMC – Humanity and Social Science</b>
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<b>L - Lecture</b>	<b>T - Tutorials</b>	<b>P - Practical</b>	<b>S - Self Study</b>
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CV Scheme and Syllabus 2020-21

### Fifth Semester B.E. - Scheme

Sl. No	Course Code	Course	Teaching Department	L-T-P-S (Hrs/week)	Total Credits	Marks
1	18CVI51	Transportation Engineering (IC)	CE	3-0-2-0	4	100
2	18CVI52	Fluid Mechanics (IC)	CE	3-0-2-0	4	100
3	18CVT53X	Foundation Elective - IV	CE	4-0-0-0	4	100
4	18EET54X	Engineering Elective - V	CE	4-0-0-0	4	100
5	18CVT55	Structural Analysis-II	CE	3-0-0-0	3	100
6	18CVL56	Cad Lab.	CE	1-0-2-0	2	100
7	18CVH57	General Aptitude	CE	2-0-0-0	2	100
8	18CVT58	Environment Science	CE	1-0-0-0	1	100
Total				21-0-6-0	24	800

Foundation Elective – IV		
Sl. No	Course Code	Course
1	18CVT531	Railways, Harbours & Tunnels
2	18CVT532	Hydrology and Irrigation Engineering
3	18CVT533	Natural Disaster Mitigation and Management
4	18CVT534	Construction Management and Engineering Economics
5	18CVT535	Design of Masonry Structures
6	18CVT536	Rural Water Supply and Sanitation

Engineering Elective – V		
Sl. No	Course Code	Course
1	18 EET 541	Solid Waste Management(CV)
2	18 EET 542	Modeling of Residential Building using AI(CSE)
3	18 EET 543	Metal Forming Process (ME)
4	18 EET 544	C++ (EC)
5		

IC – Integrated Course	L - Lecture	T - Tutorials	P - Practical	S - Self Study
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CV Scheme and Syllabus 2020-21

### Sixth Semester B.E. - Scheme

Sl. No	Course Code	Course	Teaching Department	L-T-P-S (Hrs/week)	Total Credits	Marks
1	18CVI61	Limit State Design of Reinforced Concrete & Steel Structures (IC)	CE	3-0-2-0	4	100
2	18CVT62	Geotechnical Engineering	CE	4-0-0-0	4	100
3	18CVI63	Environmental Engineering (IC)	CE	3-0-2-0	4	100
4	18CVT64X	Foundation Elective -VI	CE	3-0-0-0	3	100
5	18EET65X	Engineering Elective -VII	CE	4-0-0-0	4	100
6	18HOE66X	Open Electives-VIII	CE	2-0-0-0	2	100
7	18CVL67	Extensive Survey Camp	CE	1-0-2-0	2	100
8	18CVH68	Technical Aptitude and GD	CE	1-0-0-0	1	100
Total				21-0-6-0	24	800

Foundation Elective -VI		
Sl. No	Courses Code	Course
1.	18CVT641	Pavements Materials & construction
2.	18CVT642	Traffic Engineering
3.	18CVT643	Hydraulics & Hydraulics Machineries
4.	18CVT644	Industrial Waste Water Treatment
5.	18CVT645	Repair and Rehabilitation of Structures
6.		

Engineering Elective -VII		
Sl. No	Course Code	Course
1	18 EET 651	Remote sensing & GIS (CV)
2	18 EET 652	Data-Driven Models for Early Prediction of Construction Time (CSE)
3	18 EET 653	Non Destructive Testing (ME)
4	18 EET 654	Python (EC)

CV Scheme and Syllabus 2020-21

Open Elective – VIII		
Sl. No	Courses Code	Course Name
1	18 HOE661	Lab View - Level 1
2	18 HOE 662	Yoga Meditation
3	18 HOE 663	Martial Arts
4	18 HOE 664	Music (Carnatic / Instrumental)
5	18 HOE 665	Dance
6	18 HOE 666	Sports
8	18 HOE 668	Basics of Photography
9	18 HOE 669	Online Certificate courses from NPTEL

IC – Integrated Course	L - Lecture	T - Tutorials	P - Practical	S - Self Study
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### Seventh Semester B.E -Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17CVT71	Geotechnical Engineering–II (IC)	CV	3:0:2:0	4	100
2	17CVT72	Estimation and Valuation (IC)	CV	3:0:2:0	4	100
3	17CVT73X	Foundation Elective–X	CV	3:0:0:0	3	100
4	17CVT74X	Engineering Elective–XI/ PBL	CV	3:0:0:0	3	100
5	17HOE75X	Open Elective–XII	CV/BS&H/ME	2:0:0:4	3	100
6	17HOE76X	Open Elective–XIII	CV/BS&H	2:0:0:4	3	100
7	17CVL77	Project Management Lab	CV	0-0-2-0	1	100
8	17CVL78	Analysis and Design Lab–II	CV	1:0:2:0	2	100
9	17CVP79	Project Phase–I	CV	1-0-4-0	3	100
<b>Total</b>				<b>18-0-12-8</b>	<b>26</b>	<b>900</b>

### Foundation Elective – X

Sl. No.	Course Code	Course
1	17CVT731	Construction Industry Practice–III
2	17CVT732	Pre–Stressed Concrete Structures
3	17CVT733	Pavement Design

### Engineering Elective – XI / PBL

Sl. No.	Course Code	Course
1	17CVT741	Fire safety and management
2	17CVT742	Fundamentals of Energy, Environment and climate change
3	17CVT743	Industrial Waste Water treatment

### Open Elective – XII

Sl. No.	Course Code	Course
1	17HOE751	Tax Management
2	17HOE752	Assessment of Building Energy Performance(Offered by ASHRAE)
3	17HOE753	Natural Disaster Mitigation and Management
4	17HOE754	Online Certification courses from IITs / IISc / SWAYAM / EDX

### Open Elective – XIII

Sl. No.	Course Code	Course
1	17HOE761	Small and Medium Enterprise Management
2	17HOE762	Occupational Safety and Health Administration
3	17HOE763	Animation and Multimedia Engineering
4	17HOE764	Online Certification courses from IITs / IISc / SWAYAM / EDX

### Eight Semester B.E - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	Total Credits	Marks
1	17CVP81	Project Phase-II	CV	4	100
2	17CVP82	Project Phase-III	CV	4	100
3	17CVP83	Evaluation and Viva voce (External)	CV	10	100
		<b>Total</b>		<b>18</b>	<b>300</b>

IC - Integrated Course

L - Lecture

T-Tutorials

P-Practical

S - Self Study

  
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**Choice Based Credit System**  
**Outcome Based Education Curriculum**

**2020-2021**

Department of Computer Science and Engineering  
**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
Mudugurki Village, VenkatagiriKote Post, Devanahalli taluk,  
Bangalore district - 562 164

  
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***DEPARTMENT OF COMPUTER SCIENCE &  
ENGINEERING***

**III to VIII Semester  
*Scheme and Syllabus***

**VISION**

Excellence in creating globally competent professionals and moulding them as leaders in Computer Science & Engineering education and research

**MISSION**

- M1:** Maintaining excellence in Computer Science & Engineering education through academic professionalism, teaching, curricula which reflect the changing needs of the society.
- M2:** Establishing center of excellence by creating knowledge through research and industrial exposure in the area of Computer Science & Engineering.
- M3:** Developing communication skill, leadership qualities, teamwork & skills for continuing education among the students.
- M4:** Inculcating ethics, human values and skills for solving societal problems and environmental protection.
- M5:** Validate engineering knowledge through innovative research projects to enhance their employability and entrepreneurship skills.

***With Effect from Academic Year 2020-21***

## **PROGRAM EDUCATIONAL OBJECTIVES (PEOs)**

The graduates of Computer Science and Engineering are expected to fulfill the following PEOs after a few years of their graduation.

**PEO1:** Graduates in Computer Science and Engineering will apply the technical knowledge of analysis and design of software used for sustainable societal growth.

**PEO2:** Graduates of Computer Science and Engineering will demonstrate logical thinking and programming skills.

**PEO3:** Graduates in Computer Science and Engineering will demonstrate good communication skills, dynamic leadership qualities with concern for environmental protection.

**PEO4:** Computer Science and Engineering graduates will be capable of pursuing higher studies, take up research and development work blended with ethics and human values.

**PEO5:** Computer Science and Engineering graduates will have the ability to become entrepreneurs there by switching over from responsive engineer to creative engineer.

## **PROGRAM OUTCOMES (POs):**

Graduates of the Computer Science and Engineering Programme will be able to achieve the following POs:

### **PO1: Engineering Knowledge:**

Apply the knowledge of mathematics, science, engineering fundamentals, and **Computer Science and Engineering** principles to the solution of complex problems in **Computer Science and Engineering**.

### **PO2: Problem Analysis:**

Identify, formulate, research literature, and analyze complex **Computer Science and Engineering** problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.

### **PO3: Design/Development of Solutions:**

Design solutions for complex **Computer Science and Engineering** problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4: Conduct investigations of Complex problems:**

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions related to **Computer Science and Engineering** problems.

**PO5: Modern Tool Usage:**

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex **Computer Science and Engineering** activities with an understanding of the limitations.

**PO6: The Engineer and Society:**

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional **Computer Science and Engineering** practice.

**PO7: Environment and Sustainability:**

Understand the impact of the professional **Computer Science and Engineering** solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO8: Ethics:**

Apply ethical principles and commit to professional ethics and responsibilities and norms of the **Computer Science and Engineering** practice.

**PO9: Individual and Team work:**

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10: Communication:**

Communicate effectively on complex **Computer Science and Engineering** activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11: Project Management and Finance:**

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage **Computer Science and Engineering** projects and in multidisciplinary environments.

**PO12: Life Long Learning:**

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**PROGRAM SPECIFIC OUTCOMES (PSOs):**

Program Specific Outcomes (PSOs) are what the graduates of a specific undergraduate engineering program should be able to do at the time of graduation.

**PSO1: Professional Skills:**

The ability to understand, analyze and develop computer programs in the areas related to system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying complexity.

**PSO2: Problem-Solving Skills:**

The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.

**PSO3: Foundation of mathematical concepts:**

Ability to apply mathematical concepts to solve real world problems using appropriate data structure and suitable algorithms.



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**Third Semester B.E. – Scheme**

SL. No	Course Code	Course Name	Total Credits	L:T:P:S (Hrs/Week)	Online	Offline	Marks	Weekly load
1	19CSM31	Integral Transforms & Applications	3	2 : 2 : 0 : 0	-	100%	100	0+4
2	19CSI32	Data Structures using C(IC)	4	2 : 0 : 4 : 0		100%	100	0+8
3	19CSI33	Web Programming (IC)	3	2 : 0 : 4 : 0		100%	100	0+6
4	19CSI34	Python Programming (IC)	4	2 : 0 : 4 : 0		100%	100	0+8
5	19CST35	Analog and Digital Electronics	3	2 : 2 : 0 : 0	20%	80%	100	1+2
6	19CST36	Computer Organization & Architecture	3	2 : 2 : 0 : 0	80%	20%	100	2+1
7	19CPH37	Constitution of India and Professional Ethics and Human Rights	1	0 : 2 : 0 : 0	100%	-	100	1+0
8	19KAK38	Kannada	1	0 : 2 : 0 : 0	100%		100	1+0
9		Placement Training-I	2	1 : 0 : 2 : 0	-	100%	100	0+2
		<b>Total</b>	<b>24</b>	<b>13: 10 :14 :0</b>			<b>900</b>	<b>5+31</b>

  
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**Fourth Semester B.E. – Scheme**

SL. No	Course Code	Course Name	Total Credits	L:T:P:S (Hrs/Week)	Online	Offline	Marks	Weekly load
1	19CSM41	Statistics and Probability	3	2 : 2 : 0 : 0	-	100%	100	0+4
2	19CSI42	Design and Analysis of Algorithms (IC)	4	2 : 0 : 4 : 0	-	100%	100	0+8
3	19CSI43	Object Oriented Programming with Java (IC)	4	2 : 0 : 4 : 0		100%	100	0+8
4	19CSI44	Database Concepts through MySQL (IC)	3	2 : 0 : 2 : 0		100%	100	0+6
5	19CST45	Operating Systems	3	2 : 2 : 0 : 0	70%	30%	100	2+1
6	19CST46	Introduction to Microprocessors & Microcontrollers	3	2 : 2 : 0 : 0	30%	70%	100	1+2
7	19UHV47	Universal Human Values-2	3	3 : 0 : 0 : 0	100%		100	2+0
8		Placement Training-II	2	1 : 0 : 2 : 0		100%	100	0+2
		<b>Total</b>	<b>25</b>	<b>16 : 6 : 12 : 0</b>			<b>800</b>	<b>5+31</b>
<b>Note: Internship has to be completed compulsorily before VIII Semester</b>								

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Department of Computer Science and Information Science and Engineering

**Fifth Semester BE – Scheme**

Sl. No.	Course Code	Course Name	Teaching Dept.	L-T-P-S (Hrs./Week)	Total Credits	Marks
1.	18CSI51	Database Concepts	CSE/ISE	3:0:2:0	4	100
2.	18CSI52	Advanced JAVA	CSE/ISE	3:0:2:0	4	100
3.	18CST53	Operating Systems	CSE/ISE	3:1:0:0	3	100
4.	18CST54	Software Engineering	CSE/ISE	3:1:0:0	3	100
5.	18CSI55X	Foundation Elective-IV	CSE/ISE	3:0:2:0	4	100
6.	18EET56X	Engineering Elective-V	CSE/ISE/ECE/CIVIL	3:1:0:0	3	100
7.	18CSL57	Operating Systems Laboratory	CSE/ISE	1:0:2:0	2	100
8.	18CSH58	Environmental Science	CSE/ISE	1:0:0:0	1	100
9.	18CSH59	Placement Training-III	Placement Department	1:0:2:0	2	100
		<b>Total</b>			<b>26</b>	<b>900</b>

**Foundation Elective- IV (IC)**

Sl. No.	Course Code	Course Name
1	18CSI551	Introduction to Microcontrollers & Microprocessors
2	18CSI552	Artificial Intelligence
3	18CSI553	PHP Programming

**Engineering Elective -V**

Sl. No.	Course Code	Course Name
1	18EET561	Information Retrieval
2	18EET562	Digital Switching Systems
3	18EET563	Green Buildings
4	18EET564	Project Based Learning/Mini Projects

### Sixth Semester BE – Scheme

Sl. No.	Course Code	Course Name	Teaching Dept.	L:T:P-S (Hrs./Week)	Total Credits	Marks
1.	18CST61	Python Programming	CSE/ISE	3:1:0:0	3	100
2.	18CSI62	Computer Networks	CSE/ISE	3:0:2:0	4	100
3.	18CSI63	Android Application Development	CSE/ISE	3:0:2:0	4	100
4.	18CSI64X	Foundation Elective-VI	CSE/ISE	3:0:2:0	4	100
5.	18EET65X	Engineering Elective-VII	CSE/ISE/ECE/CIVIL	3:1:0:0	3	100
6.	18HOE66X	Open Elective –VIII	CSE/ISE/ECE/CIVIL	3:0:0:0	3	100
7.	18CSL67	Python Programming Laboratory	CSE/ISE	1:0:2:0	2	100
8.	18CSH68	Humanities	BASIC SCIENCE	3:0:0:0	1	100
9.	18CSH69	Placement Training- IV	Placement Department	2:0:2:0	3	100
		<b>Total</b>			<b>27</b>	<b>900</b>

### Foundation Elective- VI (IC)

Sl. No.	Course Code	Course Name
1	18CSI641	Advanced Cloud Computing
2	18CSI642	Introduction to Block Chain
3	18CSI643	Information & Network Security

### Engineering Elective -VII

Sl. No.	Course Code	Course Name
1	18EET651	Image Processing
2	18EET652	Nano-electronics
3	18EET653	Water Resources Engineering
4	18EET654	Project Based Learning/certification (NPTEL, IITs etc.)

## Open Elective -VIII

Sl. No.	Course Code	Course Name
1	18HOE661	Technical Certification+ Seminar
2	18HOE662	Robotic Process Automation
3	18HOE663	Yoga and Meditation

**Seventh Semester B.E. – Scheme**

Sl. No.	Course Code	Course Name	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17CSI71	Internet of Things (IoT) (IC)	CS	3-0-2-0	4	100
2	17CST72	Android Application Development	CS	2-0-0-0	2	100
3	17CSI73X	Foundation Elective-IX (IC)	CS	3-0-2-0	4	100
4	17CST74X	Engineering Elective-X /PBL	CS	3-0-0-0	3	100
5	17HOE75X	Open Elective-XI	CS/BS&H/ ME	2-0-0-4	3	100
6	17HOE76X	Open Elective-XII	CS/BS&H	2-0-0-4	3	100
7	17CSL77	Information and Network Security Laboratory	CS	1-0-2-0	2	100
8	17CSL78	Android Application Development Laboratory	CS	1-0-2-0	2	100
9	17CSP79	Project Phase-I and Seminar	CS	0-0-6-0	3	100
	<b>Total</b>			<b>17-0-14-8</b>	<b>26</b>	<b>900</b>

**Foundation Elective - IX (IC)**

Sl. No.	Course Code	Course Name
1	17CSI731	Object Oriented Modeling and Designing
2	17CSI732	Big Data
3	17CSI733	Web Technologies – Servlet, JSP

**Engineering Elective - X / PBL**

Sl. No.	Course Code	Course Name
1	17CST741	System Modeling and Simulation
2	17CST742	C# and .Net (MOOCS)
3	17CST743	Managing Big Data with MySQL (Certificate Course), Duke University

### Open Elective - XI

Sl. No.	Course Code	Course Name
1	17HOE751	Tax Management
2	17HOE752	Assessment of Building Energy Performance (Offered by ASHRAE)
3	17HOE753	National Disaster Management and Mitigation
4	17HOE754	Certification Course (Online)

### Open Elective - XII

Sl. No.	Course Code	Course Name
1	17HOE761	Small & Medium Enterprise Management
2	17HOE762	Occupational Safety and Health Administration
3	17HOE763	Animation and Multimedia Engineering
4	17HOE764	Certification Course (Online)



**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System CBCS**

***Outcome Based Education Curriculum***

***2020-2021***

Department of Electronics & Communication Engineering

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, Venkatagirikote Post, Devanahalli taluk,  
Bangalore district - 562 164

**PRINCIPAL**

Nagarjuna College of Engineering & Technology  
Devanahalli (Tq) Bengaluru (Dt.)-Pin: 562164



**An Autonomous College under VTU**

## **DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

### **VISION**

To transform the students as leaders in Electronics & Communication Engineering to achieve professional excellence in the challenging future

### **MISSION**

- M1: To create an environment for the students to have strong academic fundamentals and enable them to be life-long learners.
- M2: To provide modern tools to the students in the field of electronics and communication to meet the real-world challenges.
- M3: To develop Communication skill, leadership qualities, team work and skills for continuing education among the students.
- M4: To inculcate Ethics, Human values and skills for solving societal problems and environmental protection.
- M5: Validate engineering knowledge through innovative research projects to enhance their employability and entrepreneurship skills.

### **III to VIII Semesters Scheme and Syllabus With effect from Academic Year 2020-21**



## **Program Educational Objectives (PEOs)**

**PEO-1:** Graduates of Electronics and Communication engineering will be using the basic academic knowledge of design and analysis required in the industry for sustainable societal growth.

**PEO-2:** Graduates of Electronics and Communication engineering will be able to design project based learning and team based learning.

**PEO-3:** Graduates in Electronics and Communication engineering will demonstrate good communication skills, dynamic leadership qualities with concern for environmental protection.

**PEO-4:** Electronics and Communication engineering graduates will be capable of pursuing higher studies, take up research and development work blended with ethics and human values.

**PEO-5:** Electronics and Communication engineering graduates will have the ability to get employed and become entrepreneurs thereby switching over from responsive engineering to creative engineering.

## **Program Outcomes and Program Specific Outcomes as defined by the Program**

### **Program Outcome:**

**PO1:** Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and electronics and communication engineering principles to the solution of complex problems in electronics and communication engineering.

**PO2:** Problem Analysis: Identify, formulate, research literature, and analyze complex electronics and communication engineering problems reaching substantiated conclusions using first principles of mathematics, and engineering sciences.

**PO3:** Design/Development of Solutions: Design solutions for complex electronics and communication engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4:** Conduct Investigations of Complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions related to electronics and communication engineering problems.

**PO5:** Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex electronics and communication engineering activities with an understanding of the limitations.

**PO6:** The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities

relevant to the professional electronics and communication engineering practice.

**PO7: Environment and Sustainability:** Understand the impact of the professional electronics and communication engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the electronics and communication engineering practice.

**PO9: Individual and Teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10: Communication:** Communicate effectively on complex electronics and communication engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11: Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12: Life Long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### **Program Specific Outcome (PSO):**

**PSO1.** Graduate will be able to identify, analyze & solve the problems related to Electronics and Communication Engineering by applying the fundamental knowledge of Electronics and Communication.

**PSO2.** Graduate will demonstrate an ability to investigate, design and develop both software and hardware using significant knowledge of modern tools in Electronics and Communication Engineering.

**PSO3.** Graduate will be able to apply their knowledge to assess societal, environmental, health, safety issues with professional ethics and can also pursue higher studies, involve in research activities, be employable or entrepreneur.

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGG**

**Third Semester B.E.-Scheme**

Sl. No	Course Code	Course	Teaching Dept	L-T-P (Hrs/week)	Total Credits	Marks
1	19MAT31	Fourier series, Transforms and Numerical Techniques	Mathematics	3-2-0	4	100
2	19ECT32	Analog Electronic Circuits	EC	3-0-0	3	100
3	19ECI33	Digital Electronic Circuits(IC)	EC	3-0-2	4	100
4	19ECT34	Network Analysis	EC	2-2-0	3	100
5	19ECT35	Data Structure using C	CS/IS	3-0-0	3	100
6	19ECT36	Electronic Instrumentation	EC	3-0-0	3	100
7	19ECL37	Analog Electronics Circuits Lab	EC	1-0-2	2	100
8	19CPH38	Constitution of India and Professional Ethics and Human Rights	S&H	1-0-0	1	100
9	19ECH39	Elements of Communication	PT	0-0-4	2	100
<b>TOTAL</b>				<b>19-4-8</b>	<b>25</b>	<b>900</b>

  
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**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGG**

**Fourth Semester B.E.-Scheme**

Sl. No	Course Code	Course	Teaching Dept	L-T-P (Hrs/week)	Total Credits	Marks
1	19MAT41	Applied Calculus and Probability Distribution	Mathematics	3-2-0	4	100
2	19ECT42	Microprocessors and Microcontrollers	EC	3-0-0	3	100
3	19ECI43	Fundamentals of HDL (IC)	EC	3-0-2	4	100
4	19ECT44	Signals and Systems	EC	2-2-0	3	100
5	19ECT45	Engineering Electromagnetics	EC	2-2-0	3	100
6	19ECL46	Microprocessors and Microcontrollers LAB	EC	1-0-2	2	100
7	19ECT47	Universal Human Values	S&H	3-0-0	3	100
8	19KVK48/ 19KAK48	Vyavaharika/Adalitha Kannada	S&H	1-0-0	1	100
9	19ECH49	Professional Development of Engineers	PT	0-0-4	2	100
<b>TOTAL</b>				<b>18-6-8</b>	<b>25</b>	<b>900</b>

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGG**

**Fifth Semester B.E.-Scheme**

Sl. No	Course Code	Course	Teaching Dept	L-T-P (Hrs/week)	Total Credits	Marks
1	18ECT51	Analog Communication	EC	3-2-0	4	100
2	18ECI52	Fundamentals of CMOS VLSI (IC)	EC	3-0-2	4	100
3	18ECT53	Information Theory and Coding	EC	2-2-0	3	100
4	18ECT54	Accountancy and Taxation	ECH	3-0-0	3	100
5	18ECT55X	Professional Elective-I	EC	3-0-0	3	100
6	18ECT56X	Professional Elective-II	CS/IS	3-0-0	3	100
7	18ECL57	Analog Communication LAB	EC	1-0-2	2	100
8	18ECH58	Environmental Studies	S&H	1-0-0	1	100
9	18ECH59	Employability Skills and Aptitude Development	PD	0-0-4	2	100
<b>TOTAL</b>				<b>19-4-8</b>	<b>25</b>	<b>900</b>

**Professional Elective-I**

Sl.No	Course Code	Course
1	18ECT551	Digital Switching Systems
2	18ECT552	Linear Integrated Circuits
3	18ECT553	Control Systems

**Professional Elective-II**

Sl.No	Course Code	Course
1	18ECT561	Object Oriented Programming using C++
2	18ECT562	Web Technology
3	18ECT563	JAVA Programming

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGG**

**Sixth Semester B.E.-Scheme**

Sl. No	Course Code	Course	Teaching Dept	L-T-P (Hrs/week)	Total Credits	Marks
1	18ECT61	Digital Communication	EC	3-0-0	3	100
2	18ECT62	Digital Signal Processing	EC	2-2-0	3	100
3	18ECT63	Antennas and Wave Propagation	EC	3-0-0	3	100
4	18ECT64X	Professional Elective-III	EC	3-0-0	3	100
5	18ECT65X	Professional Elective-IV	EC	3-0-0	3	100
6	18HOE66X	Industrial Elective-I	EC	3-0-0	3	100
7	18ECL67	Digital Communication LAB	EC	1-0-2	2	100
8	18ECL68	Digital Signal Processing LAB	EC	1-0-2	2	100
9	18ECH69	Employability Skills and Aptitude Development	PD	1-0-4	3	100
<b>TOTAL</b>				20-2-8	25	900

**Professional Elective-III**

Sl.No	Course Code	Course
1	18ECT641	ARM Processors
2	18ECT642	Internet Of Things Technology
3	18ECT643	Nano-electronics

**Professional Elective-IV**

Sl.No	Course Code	Course
1	18ECT651	Artificial Neural Networks
2	18ECT652	Image Processing
3	18ECT653	Pattern Recognition

**Industrial Elective-I**

<b>Sl.No</b>	<b>Course Code</b>	<b>Course</b>
1	18HOE661	LabVIEW – Level 1
2	18HOE662	Robotic Process Automation
3	18HOE663	Wireless and Mobile Communication

**Seventh Semester B.E. – Scheme**

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17ECT71	Power Electronics	EC	3-0-0-0	3	100
2	17ECT72	Data Communication	EC	3-0-0-0	3	100
3	17ECI73X	Foundation Elective-X (IC)	EC	3-0-2-0	4	100
4	17ECT74X	Engineering Elective-XI	EC/ME/CS	3-0-0-0	3	100
5	17HOE75X	Open Elective-XII	EC/BS&H	2-0-0-4	3	100
6	17HOE76X	Open Elective-XIII	EC/BS&H	2-0-0-4	3	100
7	17ECL77	Power Electronics Lab	EC	1-0-2-0	2	100
8	17ECL78	Data Communication Lab	EC	1-0-2-0	2	100
9	17ECP79	Project Phase-I and Seminar	EC	0-0-6-0	3	100
<b>Total</b>				<b>18-0-12-8</b>	<b>26</b>	<b>900</b>

**Foundation Elective-X (IC)**

Sl. No.	Course Code	Course
1	17ECI731	Optical Fiber Communication
2	17ECI732	Web Technology
3	17ECI733	Online Certification courses from IITs / IISc / SWAYAM / EDX

**Engineering Elective-XI / PBL**

Sl. No.	Course Code	Course
1	17ECT741	Wireless Communication
2	17ECT742	Artificial Intelligence
3	17ECT743	MEMS



### Open Elective-XII

Sl. No.	Course Code	Course
1	17HOE751	Tax Management
2	17HOE752	Assessment of Building Energy Performance (Offered by ASHRAE)
3	17HOE753	Crisis Management
4	17HOE754	Online certification courses from IITs / IISC / SWAYAM / EDX

### Open Elective-XIII

Sl. No.	Course Code	Course
1	17HOE761	Small & Medium Enterprise Management
2	17HOE762	Occupational Safety & Health Administration
3	17HOE763	Animation & Multimedia Engineering
4	17HOE774	Online certification courses from IITs / IISC / SWAYAM / EDX

### Eighth Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	Total Credits	Marks
1	17ECP81	Project Phase-II and Seminar	EC	4	100
2	17ECP82	Project Phase-III and Seminar	EC	4	100
3	17ECP83	Evaluation and Viva voce (External)	EC	10	100
<b>Total</b>				<b>18</b>	<b>300</b>

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study



**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System CBCS**

***Outcome Based Education Curriculum***

***2020-2021***

Department of Information Science and Engineering

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, VenkatagiriKote Post, Devanahalli taluk,  
Bangalore district - 562 164

  
**PRINCIPAL**

Nagarjuna College of Engineering & Technology  
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*An Autonomous College under VTU*

***DEPARTMENT OF INFORMATION  
SCIENCE & ENGINEERING***

**III to VIII Semester  
*Scheme and Syllabus***

**VISION**

To disseminate the IT knowledge among the students for achieving excellence in education and to irradiate budding engineers as leaders in information technology.

**MISSION**

**M1:** To maintain leadership and excellence in Information Technology.

**M2:** Achieving excellence in IT through analysis, design, development of software products

**M3:** Developing communication skills, leadership qualities and team work among students community by providing opportunities to work on various projects through internship with industry partners

**M4:** To inculcate Ethics and Human values for solving societal problems and environmental protection.

**M5:** Promoting research, higher studies and entrepreneurship among the students through outside world interaction

***With Effect from Academic Year 2020-21***

## **PROGRAM EDUCATIONAL OBJECTIVES (PEOs)**

The graduates of Information Science and Engineering are expected to fulfill the following PEOs after a few years of their graduation.

**PEO1:** Pursue a successful career in the field of Information Science & Engineering or a related field utilizing his/her education and contribute to the profession as an excellent employee, or as an entrepreneur.

**PEO2:** Be able to work effectively in multidisciplinary environments and be responsible members/leaders of their communities

**PEO3:** The graduates of Information Science and Engineering Program should be able to establish an understanding of professionalism, teamwork, ethics, public policy that allows them to become good professional Engineers

**PEO4:** The graduates of Information Science and Engineering Program should be able to provide novel engineering solutions and efficient software designs with legal and ethical responsibility.

**PEO5:** Continuously improve by pursuing advanced degrees in engineering, business, or other professional fields through formal means or through informal self-study.

## **PROGRAM OUTCOMES (POs):**

Graduates of the Information Science and Engineering Programme will be able to achieve the following POs:

### **PO1: Engineering Knowledge:**

Apply the knowledge of mathematics, science, engineering fundamentals, and **Information Science and Engineering** principles to the solution of complex problems in **Information Science and Engineering**.

### **PO2: Problem Analysis:**

Identify, formulate, research literature, and analyze complex **Information Science and Engineering** problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.

### **PO3: Design/Development of Solutions:**

Design solutions for complex **Information Science and Engineering** problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4: Conduct investigations of Complex problems:**

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions related to **Information Science and Engineering** problems.

**PO5: Modern Tool Usage:**

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex **Information Science and Engineering** activities with an understanding of the limitations.

**PO6: The Engineer and Society:**

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional **Information Science and Engineering** practice.

**PO7: Environment and Sustainability:**

Understand the impact of the professional **Information Science and Engineering** solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO8: Ethics:**

Apply ethical principles and commit to professional ethics and responsibilities and norms of the **Information Science and Engineering** practice.

**PO9: Individual and Team work:**

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10: Communication:**

Communicate effectively on complex **Information Science and Engineering** activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11: Project Management and Finance:**

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage **Information Science and Engineering** projects and in multidisciplinary environments.

**PO12: Life Long Learning:**

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**PROGRAM SPECIFIC OUTCOMES (PSOs):**

Program Specific Outcomes (PSOs) are what the graduates of a specific undergraduate engineering program should be able to do at the time of graduation.

**PSO1: Professional Skills:**

The ability to understand, analyze and develop algorithms and write Information application programs in the areas related to information technology

**PSO2: Problem-Solving Skills:**

Ability to understand the ethics, human values for solving societal problems and environmental protection

**PSO3: Foundation of mathematical concepts:**

Ability to understand the software development skills and practical knowledge for promoting research, higher studies and entrepreneurship.

**Third Semester B.E. – Scheme**

SL. No	Course Code	Course Name	Total Credits	L:T:P:S (Hrs/Week)	Online	Offline	Marks	Weekly load
1	19CSM31	Integral Transforms & Applications	3	2 : 2 : 0 : 0	-	100%	100	0+4
2	19CSI32	Data Structures using C(IC)	4	2 : 0 : 4 : 0		100%	100	0+8
3	19CSI33	Web Programming (IC)	3	2 : 0 : 4 : 0		100%	100	0+6
4	19CSI34	Python Programming (IC)	4	2 : 0 : 4 : 0		100%	100	0+8
5	19CST35	Analog and Digital Electronics	3	2 : 2 : 0 : 0	20%	80%	100	1+2
6	19CST36	Computer Organization & Architecture	3	2 : 2 : 0 : 0	80%	20%	100	2+1
7	19CPH37	Constitution of India and Professional Ethics and Human Rights	1	0 : 2 : 0 : 0	100%	-	100	1+0
8	19KAK38	Kannada	1	0 : 2 : 0 : 0	100%		100	1+0
9		Placement Training-I	2	1 : 0 : 2 : 0	-	100%	100	0+2
		<b>Total</b>	<b>24</b>	<b>13: 10 :14 :0</b>			<b>900</b>	<b>5+31</b>

  
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**Fourth Semester B.E. – Scheme**

SL. No	Course Code	Course Name	Total Credits	L:T:P:S (Hrs/Week)	Online	Offline	Marks	Weekly load
1	19CSM41	Statistics and Probability	3	2 : 2 : 0 : 0	-	100%	100	0+4
2	19CSI42	Design and Analysis of Algorithms (IC)	4	2 : 0 : 4 : 0	-	100%	100	0+8
3	19CSI43	Object Oriented Programming with Java (IC)	4	2 : 0 : 4 : 0		100%	100	0+8
4	19CSI44	Database Concepts through MySQL (IC)	3	2 : 0 : 2 : 0		100%	100	0+6
5	19CST45	Operating Systems	3	2 : 2 : 0 : 0	70%	30%	100	2+1
6	19CST46	Introduction to Microprocessors & Microcontrollers	3	2 : 2 : 0 : 0	30%	70%	100	1+2
7	19UHV47	Universal Human Values-2	3	3 : 0 : 0 : 0	100%		100	2+0
8		Placement Training-II	2	1 : 0 : 2 : 0		100%	100	0+2
		<b>Total</b>	<b>25</b>	<b>16 : 6 : 12 : 0</b>			<b>800</b>	<b>5+31</b>
<b>Note: Internship has to be completed compulsorily before VIII Semester</b>								



**NAGARJUNA COLLEGE OF ENGINEERING AND TECHNOLOGY**  
 (An Autonomous College under VTU)

Department of Information Science and Engineering

**Fifth Semester BE – Scheme**

Sl. No.	Course Code	Course Name	Teaching Dept.	L-T-P-S (Hrs./Week)	Total Credits	Marks
1.	18CSI51	Database Concepts	ISE/ISE	3:0:2:0	4	100
2.	18CSI52	Advanced JAVA	ISE/ISE	3:0:2:0	4	100
3.	18CST53	Operating Systems	ISE/ISE	3:1:0:0	3	100
4.	18CST54	Software Engineering	ISE/ISE	3:1:0:0	3	100
5.	18CSI55X	Foundation Elective-IV	ISE/ISE	3:0:2:0	4	100
6.	18EET56X	Engineering Elective-V	ISE/ISE/ECE/CIVIL	3:1:0:0	3	100
7.	18CSL57	Operating Systems Laboratory	ISE/ISE	1:0:2:0	2	100
8.	18CSH58	Environmental Science	ISE/ISE	1:0:0:0	1	100
9.	18CSH59	Placement Training-III	Placement Department	1:0:2:0	2	100
<b>Total</b>					<b>26</b>	<b>900</b>

**Foundation Elective- IV (IC)**

Sl. No.	Course Code	Course Name
1	18CSI551	Introduction to Microcontrollers & Microprocessors
2	18CSI552	Artificial Intelligence
3	18CSI553	PHP Programming

**Engineering Elective -V**

Sl. No.	Course Code	Course Name
1	18EET561	Information Retrieval
2	18EET562	Digital Switching Systems
3	18EET563	Green Buildings
4	18EET564	Project Based Learning/Mini Projects

### Sixth Semester BE – Scheme

Sl. No.	Course Code	Course Name	Teaching Dept.	L:T:P-S (Hrs./Week)	Total Credits	Marks
1.	18CST61	Python Programming	ISE/ISE	3:1:0:0	3	100
2.	18CSI62	Computer Networks	ISE/ISE	3:0:2:0	4	100
3.	18CSI63	Android Application Development	ISE/ISE	3:0:2:0	4	100
4.	18CSI64X	Foundation Elective-VI	ISE/ISE	3:0:2:0	4	100
5.	18EET65X	Engineering Elective-VII	ISE/ISE/ECE/CIVIL	3:1:0:0	3	100
6.	18HOE66X	Open Elective –VIII	ISE/ISE/ECE/CIVIL	3:0:0:0	3	100
7.	18CSL67	Python Programming Laboratory	ISE/ISE	1:0:2:0	2	100
8.	18CSH68	Humanities	BASIC SCIENCE	3:0:0:0	1	100
9.	18CSH69	Placement Training- IV	Placement Department	2:0:2:0	3	100
<b>Total</b>					<b>27</b>	<b>900</b>

### Foundation Elective- VI (IC)

Sl. No.	Course Code	Course Name
1	18CSI641	Advanced Cloud Computing
2	18CSI642	Introduction to Block Chain
3	18CSI643	Information & Network Security

### Engineering Elective -VII

Sl. No.	Course Code	Course Name
1	18EET651	Image Processing
2	18EET652	Nano-electronics
3	18EET653	Water Resources Engineering
4	18EET654	Project Based Learning/certification (NPTEL, IITs etc.)

## Open Elective -VIII

Sl. No.	Course Code	Course Name
1	18HOE661	Technical Certification+ Seminar
2	18HOE662	Robotic Process Automation
3	18HOE663	Yoga and Meditation

  
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## Seventh Semester B.E. – Scheme

Sl. No.	Course Code	Course Name	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17CSI71	Internet of Things (IoT) (IC)	CS	3-0-2-0	4	100
2	17CST72	Android Application Development	CS	2-0-0-0	2	100
3	17CSI73X	Foundation Elective-IX (IC)	CS	3-0-2-0	4	100
4	17CST74X	Engineering Elective-X /PBL	CS	3-0-0-0	3	100
5	17HOE75X	Open Elective-XI	CS/BS&H/ME	2-0-0-4	3	100
6	17HOE76X	Open Elective-XII	CS/BS&H	2-0-0-4	3	100
7	17CSL77	Information and Network Security Laboratory	CS	1-0-2-0	2	100
8	17CSL78	Android Application Development Laboratory	CS	1-0-2-0	2	100
9	17CSP79	Project Phase-I and Seminar	CS	0-0-6-0	3	100
	<b>Total</b>			<b>17-0-14-8</b>	<b>26</b>	<b>900</b>

## Foundation Elective - IX (IC)

Sl. No.	Course Code	Course Name
1	17CSI731	Object Oriented Modeling and Designing
2	17CSI732	Big Data
3	17CSI733	Web Technologies – Servlet, JSP

## Engineering Elective - X / PBL

Sl. No.	Course Code	Course Name
1	17CST741	System Modeling and Simulation
2	17CST742	C# and .Net (MOOCS)
3	17CST743	Managing Big Data with MySQL (Certificate Course), Duke University

## Open Elective - XI

Sl. No.	Course Code	Course Name
1	17HOE751	Tax Management
2	17HOE752	Assessment of Building Energy Performance (Offered by ASHRAE)
3	17HOE753	National Disaster Management and Mitigation
4	17HOE754	Certification Course (Online)

## Open Elective - XII

Sl. No.	Course Code	Course Name
1	17HOE761	Small & Medium Enterprise Management
2	17HOE762	Occupational Safety and Health Administration
3	17HOE763	Animation and Multimedia Engineering
4	17HOE764	Certification Course (Online)



**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System CBCS**

***Outcome Based Education Curriculum***

***2020-2021***

Department of Mechanical Engineering

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, VenkatagiriKote Post, Devanahalli taluk,  
Bangalore district - 562 164

  
**PRINCIPAL**

Nagarjuna College of Engineering & Technology  
Devanahalli (Tq) Bengaluru (Dt.)-Pin: 562164



**NAGARJUNA**

**COLLEGE OF ENGINEERING & TECHNOLOGY**

*An Autonomous College under VTU*

***DEPARTMENT OF MECHANICAL  
ENGINEERING***

**VISION**

To train the students as professionals in Mechanical Engineering blended with leadership qualities to achieve excellence in the challenging future.

**MISSION**

- M1:** Maintaining excellence in Mechanical Engineering education through academic professionalism and teaching for the changing needs of the society.
- M2:** Establishing Centre of excellence for research to promote industrial exposure in the area of Mechanical Engineering.
- M3:** Developing communication skill, leadership qualities, team work and skills for continuing education among the students
- M4:** Inculcating ethics, human values and skills for solving societal problems and environmental protection
- M5:** Creating opportunities to the students for experiencing real time problems through project works to enhance employability and entrepreneurship.

**V & VIII Semesters**

*Scheme and Syllabus*

*With effect from Academic Year 2020-21*

## **Program Educational Objectives (PEOs)**

**The Graduates of Mechanical Engineering are expected to fulfill the following PEOs after few years of their graduation.**

**PEO-1:** Graduates in Mechanical Engineering will apply the basic technical knowledge for design and analysis of mechanical systems.

**PEO-2:** Graduates in Mechanical Engineering will demonstrate research and innovation skills.

**PEO-3:** Graduates in Mechanical Engineering will demonstrate good communication skills, dynamic leadership qualities and awareness about environmental protection.

**PEO-4:** Graduates in Mechanical Engineering who are capable of pursuing higher studies, take up research and development work blended with ethics and human values.

**PEO-5:** Graduates in Mechanical Engineering who will have the ability to become entrepreneurs thereby switching over from responsive engineering to creative engineering.

## **Program Outcomes (POs)**

**PO1:** Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and



Mechanical Engineering principles to the solution of complex problems in Mechanical Engineering.

**PO2:** Problem analysis: Identify, formulate, research interpretation, and analyze complex Mechanical Engineering problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.

**PO3:** Design/Development of solutions: Design solutions for complex Mechanical Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal, and environmental considerations.

**PO4:** Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions related to Mechanical Engineering problems.

**PO5:** Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering tools such as CAD, CAM, CIM and FEM including prediction and modelling to complex Mechanical Engineering activities with an understanding of the limitations.

**PO6:** The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the

consequent responsibilities relevant to the professional Mechanical Engineering practice.

**PO7:** Environment and sustainability: Understand the impact of the professional Mechanical Engineering solutions in societal, environmental contexts, demonstrate the knowledge and need for sustainable development.

**PO8:** Ethics: Apply ethical principles and commit to professional ethics, responsibilities and norms of the Mechanical Engineering practice.

**PO9:** Individual and Team Work: Functions effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.

**PO10:** Communication: Communicate effectively on complex Mechanical Engineering activities with the engineering community and with society at large such as, being able to comprehend and write effective reports and design documentation, make effective presentations and give / receive clear instructions

**PO11:** Project Management and Finance: Demonstrate knowledge and understanding the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12:** Life-long Learning: Recognize the need and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## Fifth Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	18MET51	Machine Design-I	ME	3-0-0-0	3	100
2	18MEI52	Dynamics of Machines (IC)	ME	3-0-2-0	4	100
3	18MET53	Artificial Intelligence And Robotics	ME	3-0-0-0	3	100
4	18MEI54	Fluid Mechanics (IC)	ME	3-0-2-0	4	100
5	18MET55X	Foundation Elective-III	ME	3-0-0-0	3	100
6	18MET56X	Engineering Elective-II	ME	3-0-0-0	3	100
7	18MEL57	Energy Conversion Laboratory	ME	1-0-2-0	2	100
8	18MEL58	Robotics Laboratory	ME	1-0-2-0	2	100
9	18MEH59	General Aptitude	ME/ BS&H	2-0-0-0	2	100
<b>Total</b>				<b>22-0-8-0</b>	<b>26</b>	<b>900</b>

## Foundation Elective-III

Sl. No.	Course Code	Course
1	18MET551	Composite Material Technology
2	18MET552	Power Plant Engineering
3	18MET553	HVAC-I

**Outcome Based Education**  
**Choice Based Credit System**  
**Engineering Elective-II**

Sl. No.	Course Code	Course
1	18MET561	Metal Forming Process
2	18MET562	Mechatronics
3	18MET563	Economics of Engineering

**Sixth Semester B.E. - Scheme**

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	18MET61	Machine Design-II	ME	3-0-0-0	3	100
2	18MEI62	Computer Integrated Manufacturing (IC)	ME	3-0-2-0	4	100
3	18MEI63	Finite Element Methods (IC)	ME	3-0-2-0	4	100
4	18MET64X	Foundation Elective-VI	ME	3-0-0-0	3	100
5	18MET65X	Engineering Elective-III PBL	ME	3-0-0-0	3	100
6	18HOE66X	Open Elective-I	ME/BS&H	2-0-0-4	3	100
7	18MEL67	Fluid Machinery Laboratory	ME	1-0-2-0	2	100
8	18MEP68	Mini Project and Seminar	ME	1-0-2-0	2	100
9	18MEH69	Technical Aptitude and Group Discussion	ME/BS&H	2-0-0-0	2	100
<b>Total</b>				<b>21-0-8-4</b>	<b>26</b>	<b>900</b>

**Foundation Elective-VI**

Sl. No.	Course Code	Course
1	18MET641	Non-Conventional Machining
2	18MET642	Turbo machines
3	18MET643	HVAC-II

Engineering Elective-III / PBL

Sl. No.	Course Code	Course
1	18MET651	Refrigeration and Air Conditioning
2	18MET652	Operations Research
3	18MET653	Wind Energy Engineering

Open Elective-I

Sl. No.	Course Code	Course
1	18HOE661	Lab View – Level 1
2	18HOE662	Yoga and Meditation
3	18HOE663	Martial Arts
4	18HOE664	Music (Carnatic Vocal / Instrumental)
5	18HOE665	Dance
6	18HOE666	Sports
7	18HOE667	Online Certification Courses from IITs / IISc / SWAYAM / EDX

Seventh Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17MEI71	Mechanical Vibrations (IC)	ME	3-0-2-0	4	100
2	17MET72	Heat and Mass Transfer	ME	3-0-0-0	3	100
3	17MET73X	Foundation Elective-V	ME	3-0-0-0	3	100
4	17MET74X	Engineering Elective-IV	ME	3-0-0-0	3	100
5	17HOE75X	Open Elective-II	ME/BS&H	2-0-0-4	3	100
6	17HOE76X	Open Elective-III	ME/BS&H	2-0-0-4	3	100
7	17MEL77	Computer Aided Modelling and Analysis Laboratory	ME	1-0-2-0	2	100
8	17MEL78	Heat and Mass Transfer Laboratory	ME	1-0-2-0	2	100

9	17MEP79	Project Phase-I and Seminar	ME	1-0-4-0	3	100
<b>Total</b>				<b>19-0-10-8</b>	<b>26</b>	<b>900</b>

**Foundation Elective-V**

Sl. No.	Subject Code	Course
1	17MET731	Engineering Management & Entrepreneurship
2	17MET732	Hydraulics and Pneumatics
3	17MET733	HVAC-III

**Engineering Elective-IV**

Sl. No.	Subject Code	Course
1	17MET741	Safety, Security & Building Management Systems
2	17MET742	Foundry Technology
3	17MET743	Biomass Energy Systems

  
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### Open Elective-II

Sl. No.	Course Code	Course
1	17HOE751	Tax Management
2	17HOE752	Assessment of Building Energy Performance
3	17HOE753	Natural Disaster Mitigation & Management
4	17HOE754	Online Certification Program – MOOCS/NPTEL/IIT/EDX/ Course Era certification. Equivalent to 36 – 40 hours approved by Department

### Open Elective-III

Sl. No.	Course Code	Course
1	17HOE761	Small and Medium Enterprise Management
2	17HOE762	Occupational Safety & Health Administration
3	17HOE763	Animation & Multimedia Engineering
4	17HOE764	Online Certification Program – MOOCS/NPTEL/IIT/ EDX/Course Era certification. Equivalent to 36 – 40 hours approved by Department

### Eighth Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	Total Credits	Marks
1	17MEP81	Project Phase-II	ME	4	100
2	17MEP82	Project Phase-III	ME	4	100
3	17MEP83	Evaluation and Viva-Voce (External)	ME	10	100
<b>Total</b>				<b>18</b>	<b>300</b>

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
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**Choice Based Credit System CBCS**

Syllabus – I to IV Semester M.Tech  
(Construction Technology)  
Outcome Based Education Curriculum

2020-2021

**Department of Civil Engineering**  
**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
**Mudugurki Village, Venkatagiri Kote Post,**  
**Devanahalli taluk,**  
**Bangalore district - 562 164**





**An Autonomous College under VTU**

## **DEPARTMENT OF CIVIL ENGINEERING**

### **VISION**

To transform the students as leaders in Civil Engineering to achieve professional excellence in the challenging future.

### **MISSION**

**M1:** To provide the Civil Engineering knowledge and skills for students through an excellent academic environment.

**M2:** Adopting innovative teaching techniques using modern engineering tools for designing, modeling and analyzing the societal and environmental problems.

**M3:** Developing Communication skill, leadership qualities through teamwork and skills for continuing education among the students.

**M4:** To inculcate moral, ethical and professional values among students to serve the society.

**M5:** Validate engineering knowledge through innovative research projects to enhance their employability and entrepreneurship skills.

## ***Program Outcome (PO)***

### **PO1: Engineering Knowledge:**

Apply the knowledge of mathematics, science, engineering fundamentals and Civil Engineering principles to the solution of complex problems in Civil Engineering.

### **PO2: Problem Analysis**

Identify, formulate, research literature and analyze complex Civil Engineering problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.

### **PO3: Design/Development of Solutions:**

Design solutions for complex Civil Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

### **PO4: Conduct Investigations of Complex problems:**

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions related to Civil Engineering problems.

### **PO5: Modern Tool Usage:**

Create, select, and apply appropriate techniques, resources, and modern engineering tools such as CAD, FEM, GIS, etc. including prediction and modeling to complex Civil Engineering activities with an understanding of the limitations.

### **PO6: The Engineer and Society:**

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Civil Engineering practice.

### **PO7: Environment and Sustainability:**

Understand the impact of the professional Civil Engineering solutions in societal and environmental contexts and demonstrate the knowledge and the need for sustainable development.

### **PO8: Ethics**

Apply ethical principles and commit to professional ethics and responsibilities while following

the Civil Engineering practice.

**PO9: Individual and Team work**

Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.

**PO10: Communication**

Communicate effectively on complex Civil Engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11: Project Management and Finance**

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage Civil Engineering projects and in multidisciplinary environments.

**PO12: Life Long Learning**

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

***Program Specific Outcome (PSO)***

Program Specific Outcomes (PSOs) are what the graduates of a specific undergraduate engineering program should be able to do at the time of graduation.

**PSO1:** To carry out surveying, prepare layout plans, maps for structures and alignments for canals and roads.

**PSO2:** To specify, analyze, design, estimate and supervise construction activities such as, test and evaluate foundations and superstructures for buildings, industries, irrigation and hydraulic structures, highways, railways, airports, docks and harbors.

**PSO3:** To understand the impact of water, air and noise pollution; the methods of waste collection, disposal and processing; specify, design and analyze water supply system, sewerage and industrial effluent conveying and treatment systems.

**First Semester M.Tech (Construction Technology) - Scheme**

Sl. No	Course Code	Course	Teaching Department	L-T-P-S (Hrs/week)	Total Credits	Marks
1	20CCT11	MECHANIZATION IN CONSTRUCTION	CE	4-0-0-0	4	100
2	20 CCT12	ADVANCES IN CONSTRUCTION MATERIALS	CE	4-0-0-0	4	100
3	20 CCT13	CONSTRUCTION PROJECT MANAGEMENT	CE	4-0-0-0	4	100
4	20 CCT14	RISK AND MATERIAL MANAGMENET	CE	4-0-0-0	4	100
5	20 CCT15X	ELECTIVE - I	CE	3-0-0-0	3	100
6	20 CCT16	MATERIAL CHARACTERIZATION LABORATORY	CE	0-0-2-0	2	100
7	20 CCT17	RESEARCH METHODOLOGY & IPR	CE	2-0-0-0	2	100
Total				21-0-2-0	23	700

Elective – I		
Sl. No	Course Code	Course
1	20 CCT151	INFRASTRUCTURE PLANNING
2	20CCT152	REPAIR AND REHABILITATION OF STRUCTURES
3	20 CCT153	DESIGN OF ENERGY EFFICIENT BUILDINGS

<b>IC – Integrated Course</b>	<b>L - Lecture</b>	<b>T - Tutorials</b>	<b>P - Practical</b>	<b>S - Self Study</b>
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### Second Semester M.Tech(Construction Technology) - Scheme

Sl. No	Course Code	Course	Teaching Department	L-T-P-S (Hrs/week)	Total Credits	Marks
1	20 CCT21	CONSTRUCTION QUALITY AND SAFETY	CE	4-0-0-0	4	100
2	20 CCT22	CONSTRUCTION ECONOMICS & FINANCE	CE	4-0-0-0	4	100
3	20 CCT23	CONSTRUCTION CONTRACT MANAGEMENT	CE	4-0-0-0	4	100
4	20 CCT24X	ELECTIVE - II	CE	4-0-0-0	4	100
5	20 CCT25X	ELECTIVE – III	CE	4-0-0-0	4	100
6	20 CCT26	PROJECT MANAGEMENT LAB	CE	0-0-2-0	2	100
7	20 CCT27	TECHNICAL SEMINAR-I	CE	0-0-0-2	1	50
Total				20-0-2-2	23	650

Elective – II		
Sl. No	Course Code	Course
1	20 CCT241	PRE ENGINEERED CONSTRUCTION TECHNOLOGY
2	20 CCT242	ADVANCED CONSTRUCTION TECHNIQUES
3	20 CCT243	SOIL EXPLORATION & GROUND IMPROVEMENT TECHNIQUES

Elective – III		
Sl. No	Course Code	Course
1	20 CCT251	LEAN CONSTRUCTION AND SUPPLY CHAIN MANAGEMENT
2	20 CCT252	QUANTITY SURVEYING AND BILLING
3	20 CCT253	SPECIAL CONCRETE

<b>IC – Integrated Course</b>	<b>L - Lecture</b>	<b>T - Tutorials</b>	<b>P - Practical</b>	<b>S - Self Study</b>
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CCT Scheme and Syllabus 2019-20

### M.Tech Construction Technology

#### Third Semester- Scheme

Sl. No	Course Code	Course Name	Teaching Department	L-T-P-S (Hrs/week)	Total Credits	Marks
1.	19CCT31	Energy and Buildings	Civil Engg.	4-0-0-0	4	100
2.	19CCT32x	<b>Elective – 4</b>	Civil Engg.	4-0-0-0	4	100
3.	19CCT33x	<b>Elective – 5</b>	Civil Engg.	4-0-0-0	4	100
4.	19CCT34	Dissertation Phase 1 & Seminar	Civil Engg.	0-0-4-4	3	100
5.	19CCT35	Internship/Term paper/Mini project	Civil Engg.	0-0-0-24	6	100
<b>Total</b>				<b>12-0-4-28</b>	<b>21</b>	<b>500</b>

#### Elective – 3

1.	19CCT321	Construction Method Statement Procedures
2.	19CCT322	Building Services and Maintenance
3.	19CCT323	Repair and Rehabilitation of structures

#### Elective – 4

1	19CCT331	Construction and Demolition Waste Management
2	19CCT332	Formwork Design for Structures
3	19CCT333	Disaster Management Techniques

#### Fourth Semester- Scheme

Sl. No	Course Code	Course Name	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1	19CCT41	Dissertation Phase II	Civil Engg.	0-0-14-0	6	100
2	19CCT42	Dissertation Phase III	Civil Engg.	0-0-14-0	6	100
3	19CCT43	Dissertation final Viva Voce	Civil Engg.	0-0-04-0	4	100
<b>Total</b>				<b>0-0-32-0</b>	<b>16</b>	<b>300</b>

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
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**Choice Based Credit System (CBCS)**

Syllabus - I to IV Semester  
M.Tech (Structural Engineering)  
Outcome Based Education Curriculum

2020-2021

**Department of Civil Engineering**  
**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
**Mudugurki Village, Venkatagiri Kote Post,**  
**Devanahalli taluk,**  
**Bangalore district - 562 164**

## ***Program Outcome (PO)***

### **PO1: Engineering Knowledge:**

Apply the knowledge of mathematics, science, engineering fundamentals and Civil Engineering principles to the solution of complex problems in Civil Engineering.

### **PO2: Problem Analysis**

Identify, formulate, research literature and analyze complex Civil Engineering problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.

### **PO3: Design/Development of Solutions:**

Design solutions for complex Civil Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.

### **PO4: Conduct Investigations of Complex problems:**

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions related to Civil Engineering problems.

### **PO5: Modern Tool Usage:**

Create, select, and apply appropriate techniques, resources, and modern engineering tools such as CAD, FEM, GIS, etc. including prediction and modeling to complex Civil Engineering activities with an understanding of the limitations.

### **PO6: The Engineer and Society:**

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Civil Engineering practice.

### **PO7: Environment and Sustainability:**

Understand the impact of the professional Civil Engineering solutions in societal and environmental contexts and demonstrate the knowledge and the need for sustainable development.

### **PO8: Ethics**

Apply ethical principles and commit to professional ethics and responsibilities while following the Civil Engineering practice.

### **PO9: Individual and Team work**

Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.



**PO10: Communication**

Communicate effectively on complex Civil Engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11: Project Management and Finance**

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage Civil Engineering projects and in multidisciplinary environments.

**PO12: Life Long Learning**

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### ***Program Specific Outcome (PSO)***

Program Specific Outcomes (PSOs) are what the graduates of a specific undergraduate engineering program should be able to do at the time of graduation.

**PSO1:** To carry out surveying, prepare layout plans, maps for structures and alignments for canals and roads.

**PSO2:** To specify, analyze, design, estimate and supervise construction activities such as, test and evaluate foundations and superstructures for buildings, industries, irrigation and hydraulic structures, highways, railways, airports, docks and harbors.

**PSO3:** To understand the impact of water, air and noise pollution; the methods of waste collection, disposal and processing; specify, design and analyze water supply system, sewerage and industrial effluent conveying and treatment systems.

  
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### First Semester M.Tech (Structural Engineering) - Scheme

Sl. No	Course Code	Course	Teaching Department	L-T-P-S (Hrs/week)	Total Credits	Marks
1	20CSE11	ADVANCED DESIGN OF RCC STRUCTURES	CE	4-0-0-0	4	100
2	20CSE12	MECHANICS OF DEFORMABLE BODIES	CE	4-0-0-0	4	100
3	20CSE13	COMPUTATIONAL STRUCTURAL MECHANICS	CE	4-0-0-0	4	100
4	20CSE14	STRUCTURAL DYNAMICS	CE	4-0-0-0	4	100
5	20CSE15X	ELECTIVE - I	CE	3-0-0-0	3	100
6	20CSE16	STRUCTURAL ENGINEERING LAB-1	CE	0-0-2-0	2	100
7	20CSE17	RESEARCH METHODOLOGY AND IPR	CE	2-0-0-0	2	100
Total				21-0-2-0	23	700

Elective – I		
Sl. No	Course Code	Course
1	20CSE151	ADVANCED DESIGN OF PRE-STRESSED CONCRETE STRUCTURES
2	20CSE152	DESIGN OF PRECAST AND COMPOSITE STRUCTURES
3	20CSE153	REPAIR AND REHABILITATION OF STRUCTURES

<b>IC – Integrated Course</b>	<b>L - Lecture</b>	<b>T - Tutorials</b>	<b>P - Practical</b>	<b>S - Self Study</b>
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### Second Semester M.Tech(Structural Engineering) - Scheme

Sl. No	Course Code	Course	Teaching Department	L-T-P-S (Hrs/week)	Total Credits	Marks
1	20CSE21	ADVANCED DESIGN OF STEEL STRUCTURES	CE	4-0-0-0	4	100
2	20CSE22	EARTHQUAKE RESISTANT DESIGN OF STRUCTURES	CE	4-0-0-0	4	100
3	20CSE23	FINITE ELEMENT METHOD OF ANALYSIS	CE	4-0-0-0	4	100
4	20CSE24X	ELECTIVE - II	CE	4-0-0-0	4	100
5	20CSE25X	ELECTIVE – III	CE	4-0-0-0	4	100
6	20CSE26	STRUCTURAL ENGINEERING LAB-2	CE	0-0-2-0	2	100
7	20CSE27	TECHNICAL SEMINAR-I	CE	0-0-0-2	1	50
Total				20-0-2-2	23	650

Elective – II		
Sl. No	Course Code	Course
1	20CSE241	ADVANCED STRUCTURAL ANALYSIS
2	20CSE242	DESIGN OF RC BRIDGES
3	20CSE243	OPTIMIZATION OF STRUCTURES

Elective – III		
Sl. No	Course Code	Course
1	20CSE251	DESIGN OF TALL STRUCTURES
2	20CSE252	STRUCTURAL HEALTH MONITORING
3	20CSE253	RELIABILITY ANALYSIS OF STRUCTURES

IC – Integrated Course	L - Lecture	T - Tutorials	P - Practical	S - Self Study
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### M.Tech Structural Engineering

#### Third Semester- Scheme

Sl. No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1.	19CSE31	Stability of Structures	Civil Engineering	4-0-0-0	4	100
2.	19CSE32x	<b>Elective – 4</b>	Civil Engineering	4-0-0-0	4	100
3.	19CSE33x	<b>Elective – 5</b>	Civil Engineering	4-0-0-0	4	100
4.	19CSE34	Dissertation Phase– 1 & Seminar	Civil Engineering	0-0-4-4	3	100
5.	19CSE35	Internship/Term paper/Mini project	Civil Engineering	0-0-0-24	6	100
<b>Total</b>				<b>12-0-4-28</b>	<b>21</b>	<b>500</b>

#### Elective – 4

1.	19CSE321	Design of Floating Structures
2.	19CSE322	Advanced Construction Techniques
3.	19CSE323	Design of Plates and Shells

#### Elective – 5

1.	19CSE331	Design of Composite Structures
2.	19CSE332	Design of Masonry Structures
3.	19CSE333	Formwork Design for Structures

#### Fourth Semester - Scheme

Sl. No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1	19CSE41	Dissertation Phase II	Civil Engg.	0-0-14-0	06	100
2	19CSE42	Dissertation Phase III	Civil Engg.	0-0-14-0	06	100
3	19CSE43	Dissertation final Viva Voce	Civil Engg.	0-0-4-0	04	100
<b>Total</b>				<b>0-0-32-0</b>	<b>16</b>	<b>300</b>

# **NAGARJUNA COLLEGE OF ENGINEERING AND TECHNOLOGY**

**Bengaluru: 562164**

An Autonomous College under Visvesvaraya Technological University,  
Belagavi

***Choice Based Credit System CBCS***

## **DEPARTMENT OF MASTER OF BUSINESS ADMINISTRATION**



**2020 - 2022**

***Outcome Based Education Curriculum***

# **Scheme and Syllabus**

**2020 - 2022**

## **ABOUT MBA AT NCET**

The department of MBA is one of the premier schools for business in Bengaluru, established in 2006, to form competent and committed leaders who are ethical, principle-centred and socially responsible with a global perspective, entrepreneurial and with managerial skills set. Department of MBA is part of Nagarjuna College of Engineering and Technology, An Autonomous College under Visvesvaraya Technological University, Belagavi. It is managed by the secretary, the directors and dedicated faculty members of Nagarjuna Education Society well-known fraternity for their outstanding contribution to higher education. MBA Department stands for its excellence in Management Education which is the flagship of Nagarjuna Group of Institutions. It strives to inculcate in the students the values of excellence, justice, honesty and service to the society.

Department of MBA primarily offers a two-year Full-time MBA course, approved by AICTE, and Accredited by NAAC 'A' Grade. NCET also offers a Ph.D program affiliated to the Visvesvaraya Technological University Belagavi. Apart from that the department offers various customized programs as an add-on course along with the regular course curriculum with a focus on skill development (Value added Program). The department concentrates on the holistic formation of students in all aspects viz., intellectual, social, emotional and with society consciousness. The college works with an undeterred zeal to offer its students the best in class education, blending classroom and experiential learning with Industries as HYBRID MBA from second Semester itself.

**Vision**

The department aims at providing excellent management education, which fosters the holistic development of the students' personality with human values and global outlook.

**Mission**

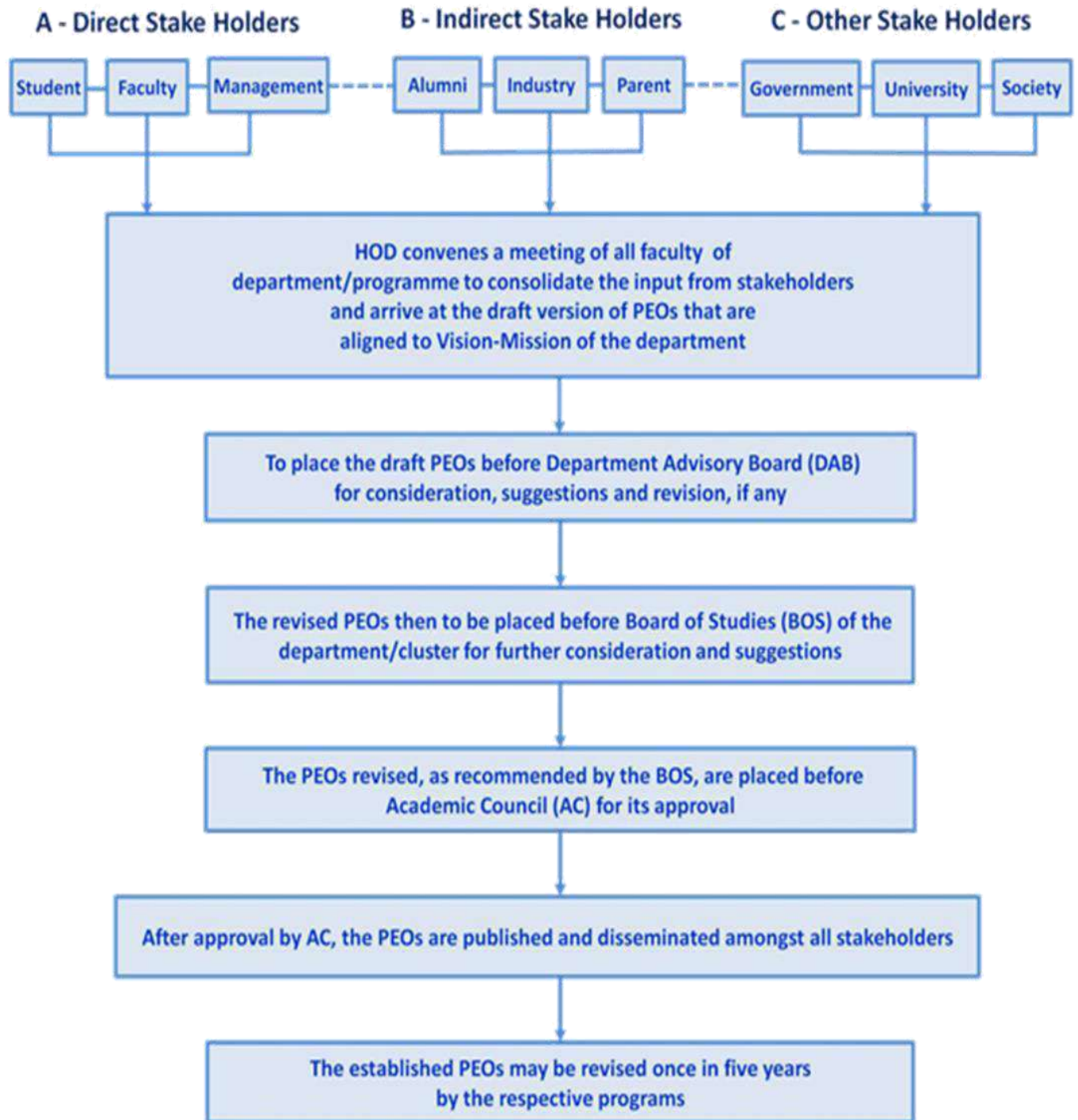
- To make management education meaningful and practical by academic integrity and accountability.
- Developing respect and tolerance for the views of every individual.
- Giving attention to issues of national and global relevance.
- Creating an unfettered spirit of exploration, rationality and enterprise.



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## **Program Educational Objective (PEOs)**

Post completion of MBA program from Nagarjuna College of Engineering and Technology, Bengaluru, our students should be:

- **PEO1:**

**Intrapreneurs and a team-players** in a company by demonstrating holistic knowledge, required skills and attitude to perform managerial function in a professional manner and solve the problems by taking sustainability into consideration.

- **PEO2:**

**Entrepreneurs** in the area of their interest and exhibit the leadership skills in managing the team and performing various functional activities in the business.

- **PEO3:**

**Researchers, consultants and teachers** in management discipline by engaging in lifelong learning, imparting knowledge and providing creative and innovative solutions.

## **Program Outcomes (POs)**

- **PO1**

Apply knowledge of management theories and practices to solve business problems.

- **PO2**

Foster analytical and critical thinking abilities for data-based decision making.

- **PO3**

Develop value-based leadership.

- **PO4**

Understand, analyse and communicate global, economic, legal and ethical aspects of business.

- **PO5**

Lead themselves and others in the achievement of Organisational goals, contributing effectively to a team environment. (Lead and attain organizational goals by contributing and building a team).

- **PO6**

Apply research skills in the area of Business.

- **PO 7**

Demonstrate positive cognition during setbacks & crises, Anticipate change in the environment, manage and develop people accordingly.

- **PO 8**

Demonstrate entrepreneurial skills, innovate and run business.

### Program Specific Objectives (PSOs)

- **PSO 1**

To adapt to the rapid changes in the ever-changing business world and the technology through continuous learning keeping the societal issues in mind.

- **PSO 2**

To function effectively as an individual by applying their skill set to create, transfer and apply knowledge for the betterment of the organization and society at large.

### PEOs and PO Mapping

PEOs/ POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
PEO 1	X	X			X	X		
PEO 2			X		X		X	X
PEO 3	X	X		X		X	X	

### Extent of relation of CO's to PO's

- Level 1: Lower Level
- Level 2: Medium level
- Level 3: High Level

  
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### Curriculum Mapping

	PO 1	PO 2	PO 3	PO4	PO5	PO6	PO 7	PO 8
Economics for Business Decisions	X			X	X	X		X
Management and Organizational Behaviour	X	X	X	X	X		X	
Marketing Management	X	X	X	X		X	X	
Accounts for Business Decisions	X	X			X	X		
Business Regulations	X	X	X		X	X		
Statistical Tools for Business Research	X	X		X	X	X		X
Human Resource Management	X		X	X	X			
Financial Management	X	X	X			X		X
Ethics, CSR	X	X	X		X			X
Operation Management	X	X			X	X	X	
Business Research Methods	X	X		X		X		
International Business Management	X			X	X	X		X
Productions and Operations Management	X				X	X		X
Entrepreneurial Development	X		X	X	X			X
Strategic Management	X	X		X	X		X	
Services Marketing	X	X		X	X	X	X	
Consumer Behaviour	X	X	X		X	X		X
Strategic Brand Management	X	X	X		X	X		
Marketing Research and Analytics	X	X	X			X		
Sales and Retail Management	X	X		X	X		X	
Integrated Marketing Communication	X		X	X	X	X		X
Digital and Social Media Marketing	X	X		X		X		
International Marketing Management	X		X		X			X
Cost Accounting	X	X			X	X		
Investment Management	X			X	X	X	X	
Direct Tax	X		X		X		X	
Mergers, Acquisitions and corporate Restructuring	X	X		X	X			
Indirect Taxation	X	X						X
Financial Derivatives	X	X		X			X	
Financial Market and Services	X			X	X		X	X
International Financial Management	X			X	X		X	X
Organizational Change and Development	X		X	X	X			
Personal Growth and Interpersonal Effectiveness	X		X		X		X	X
Performance Management and Reward System	X	X	X	X				
Labour Laws	X				X	X	X	
Organizational leadership and Development	X		X	X	X		X	
International Human Resource Management	X				X		X	X

Human Resource Metrics and Analytics	X	X		X	X			
Strategic Human Resource Management	X	X		X		X	X	
Advanced Operations Research		X			X	X	X	
Supply Chain and Logistics Management	X	X		X		X	X	
Green Supply Chain Management	X	X		X		X	X	
Strategic Purchasing and Quality Management		X			X	X	X	
Global Supply Chain Management		X		X	X		X	
Enterprise Resource Planning	X	X		X			X	
Supply Chain Information System	X	X		X		X	X	
Strategic Purchasing and Quality Management		X			X	X	X	

#### SCHEME OF STUDY - FIRST SEMESTER MBA

S No	Course Code	Name of the Course	Course Credit	Cumulative Course Credit	Nature of the Course	LTPS Hours per Week				Teaching Department
						L	T	P	S	
1.	20 MBA 11	Economics for Business Decisions	4	4	Core	4	0	0	0	MBA
2.	20 MBA 12	Management and Organizational Behaviour	4	8	Core	4	0	0	0	MBA
3.	20 MBA 13	Marketing Management	4	12	Foundation for specialization	4	0	0	0	MBA
4.	20 MBA 14	Accounting for Business Decisions	4	16	Core	4	0	0	0	MBA
5.	20 MBA 15	Business Regulations	4	20	Core	4	0	0	0	MBA
6.	20 MBA 16	Statistical Tools for Business Research	4	24	Core	4	0	0	0	MBA
7.	20 MBA 17	Seminar 1	2	26	Skill Development	0	0	0	2	MBA

L – Lecture      T-Tutorials      P-Practical      S – Self Study

#### SKILL DEVELOPMENT (Zero Credit Course)

S No	Course Code	Name of the Course	Course Credit	Nature of the Course	LTPS Hours per Week	Teaching Department
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					L	T	P	S	
1.	<b>20 MBA 01</b>	Bridge Course (Course Curriculum Designed for Finance and Non Finance Based Back ground)	0	Foundation for MBA Course	4	0	0	0	<b>MBA</b>
2.	<b>20 MBA 02</b>	Campus to Corporate Level 1	0	Skill Development	4	0	0	0	<b>MBA</b>
3.	<b>20 MBA 03</b>	Advance Excel	0	Skill Development	4	0	0	0	<b>MBA</b>

**SCHEME OF STUDY –SECOND SEMESTER MBA**

S No	Course Code	Name of the Course	Course Credit	Cumulative Course Credit	Nature of the Course	LTPS Hours per Week				Teaching Department
						L	T	P	S	
1.	<b>20 MBA 21</b>	Human Resource Management	4	30	Foundation for specialization	4	0	0	0	<b>MBA</b>
2.	<b>20 MBA 22</b>	Financial Management	4	34	Foundation for specialization	4	0	0	0	<b>MBA</b>
3.	<b>20 MBA 23</b>	Entrepreneurial Development	4	38	Core	4	0	0	0	<b>MBA</b>
4.	<b>20 MBA 24</b>	Operation Research	4	42	Foundation for specialization	4	0	0	0	<b>MBA</b>
5.	<b>20 MBA 25</b>	Business Research Methods	4	46	Core	4	0	0	0	<b>MBA</b>
6.	<b>20 MBA 26</b>	Strategic Management	4	50	Core	4	0	0	0	
7.	<b>20 MBA 27</b>	Seminar 2	2	52	Skill Development	0	0	0	2	<b>MBA</b>

L – Lecture      T-Tutorials      P-Practical      S – Self Study

**Skill Development (Zero Credit Course)**

S No	Course Code	Name of the Course	Course Credit	Nature of the Course	LTPS Hours per Week	Teaching Department
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					<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	
1.	<b>20 MBA 04</b>	Fundamentals of Data Analytics	0	Skill Development	4	0	0	0	<b>MBA</b>
2.	<b>20 MBA 05</b>	Campus to Corporate level 2	0	Skill Development	4	0	0	0	<b>MBA</b>
3.	<b>20 MBA 06</b>	International Language (Non credit based intervention)	0	Skill Development	2	0	0	0	<b>MBA</b>

**SCHEME OF STUDY –SECOND SEMESTER MBA**

S No	Course Code	Name of the Course	Course Credit	Cumulative Course Credit	Nature of the Course	LTPS Hours per Week				Teaching Department
						L	T	P	S	
1.	<b>20 MBA 21</b>	Human Resource Management	4	30	Foundation for specialization	4	0	0	0	<b>MBA</b>
2.	<b>20 MBA 22</b>	Financial Management	4	34	Foundation for specialization	4	0	0	0	<b>MBA</b>
3.	<b>20 MBA 23</b>	Entrepreneurial Development	4	38	Core	4	0	0	0	<b>MBA</b>
4.	<b>20 MBA 24</b>	Operation Research	4	42	Foundation for specialization	4	0	0	0	<b>MBA</b>
5.	<b>20 MBA 25</b>	Business Research Methods	4	46	Core	4	0	0	0	<b>MBA</b>
6.	<b>20 MBA 26</b>	Strategic Management	4	50	Core	4	0	0	0	
7.	<b>20 MBA 27</b>	Seminar 2	2	52	Skill Development	0	0	0	2	<b>MBA</b>

L – Lecture      T-Tutorials      P-Practical      S – Self Study

**Skill Development (Zero Credit Course)**

S No	Course Code	Name of the Course	Course Credit	Nature of the Course	LTPS Hours per Week				Teaching Department
					L	T	P	S	
1.	<b>20 MBA 04</b>	Fundamentals of Data Analytics	4	Skill Development	4	0	0	0	<b>MBA</b>
2.	<b>20 MBA 05</b>	Campus to Corporate level 2	4	Skill Development	4	0	0	0	<b>MBA</b>
3.	<b>20 MBA 06</b>	International Language (Non credit based intervention)	4	Skill Development	2	0	0	0	<b>MBA</b>





**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System**

***Outcome Based Education Curriculum***

**2019-2020**

Department of Computer Science and Engineering

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, VenkatagiriKote Post, Devanahalli taluk,  
Bangalore district - 562 164

  
**PRINCIPAL**

Nagarjuna College of Engineering & Technology  
Devanahalli (Tq) Bengaluru (Dt.)-Pin: 562164



**NAGARJUNA**

**COLLEGE OF ENGINEERING & TECHNOLOGY**

*An Autonomous College under VTU*

**DEPARTMENT OF COMPUTER SCIENCE  
& ENGINEERING**

**VISION**

Excellence in creating globally competent professionals and moulding them as leaders in Computer Science & Engineering education and research.

**MISSION**

- M1:** Maintaining excellence in Computer Science & Engineering education through academic professionalism, teaching, curricula which reflect the changing needs of the society.
- M2:** Establishing centre of excellence by creating knowledge through research and industrial exposure in the area of Computer Science & Engineering.
- M3:** Developing communication skill, leadership qualities, team work & skills for continuing education among the students.
- M4:** Inculcating ethics, human values and skills for solving societal problems and environmental protection.
- M5:** Validate engineering knowledge through innovative research projects to enhance their employability and entrepreneurship skills.

**III & IV Semesters**

***Scheme and Syllabus***

***With effect from Academic Year 2019-20***

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## **PROGRAM EDUCATIONAL OBJECTIVES (PEOs)**

The graduates of Computer Science and Engineering are expected to fulfill the following PEOs after a few years of their graduation.

**PEO1:** Graduates in Computer Science and Engineering will apply the technical knowledge of analysis and design of software used for sustainable societal growth.

**PEO2:** Graduates of Computer Science and Engineering will demonstrate logical thinking and programming skills.

**PEO3:** Graduates in Computer Science and Engineering will demonstrate good communication skills, dynamic leadership qualities with concern for environmental protection.

**PEO4:** Computer Science and Engineering graduates will be capable of pursuing higher studies, take up research and development work blended with ethics and human values.

**PEO5:** Computer Science and Engineering graduates will have the ability to become entrepreneurs there by switching over from responsive engineer to creative engineer.

## **PROGRAM OUTCOMES (POs):**

Graduates of the Computer Science and Engineering Programme will be able to achieve the following POs:

### **PO1: Engineering Knowledge:**

Apply the knowledge of mathematics, science, engineering fundamentals, and **Computer Science and Engineering** principles to the solution of complex problems in **Computer Science and Engineering**.

### **PO2: Problem Analysis:**

Identify, formulate, research literature, and analyze complex **Computer Science and Engineering** problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.

### **PO3: Design/Development of Solutions:**

Design solutions for complex **Computer Science and Engineering** problems and design system components or processes that meet the specified needs with appropriate

consideration for the public health and safety, and the cultural, societal, and environmental considerations.

#### **PO4: Conduct investigations of Complex problems:**

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions related to **Computer Science and Engineering** problems.

#### **PO5: Modern Tool Usage:**

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex **Computer Science and Engineering** activities with an understanding of the limitations.

#### **PO6: The Engineer and Society:**

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional **Computer Science and Engineering** practice.

#### **PO7: Environment and Sustainability:**

Understand the impact of the professional **Computer Science and Engineering** solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

#### **PO8: Ethics:**

Apply ethical principles and commit to professional ethics and responsibilities and norms of the **Computer Science and Engineering** practice.

#### **PO9: Individual and Team work:**

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

#### **PO10: Communication:**

Communicate effectively on complex **Computer Science and Engineering** activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### **PO11: Project Management and Finance:**

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage **Computer Science and Engineering** projects and in multidisciplinary environments.

### **PO12: Life Long Learning:**

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## **PROGRAM SPECIFIC OUTCOMES (PSOs):**

Program Specific Outcomes (PSOs) are what the graduates of a specific undergraduate engineering program should be able to do at the time of graduation.

### **PSO1: Professional Skills:**

The ability to understand, analyze and develop computer programs in the areas related to system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying complexity.

### **PSO2: Problem-Solving Skills:**

The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.

### **PSO3: Foundation of mathematical concepts:**

Ability to apply mathematical concepts to solve real world problems using appropriate datastructure and suitable algorithms.

**Third Semester B.E. - Scheme**

Sl. No.	Course Code	Course	Teaching Dept.	Total Credits	L-T-P-S (Hrs/week)	Marks
1	18CSM31	Integral Transforms & Applications (IC)	CSE / ISE	4	3:0:2:0	100
2	18CST32	Fundamentals of Computation Engineering	CSE / ISE	4	4:0:0:0	100
3	18CST33	Data Structures using C	CSE / ISE	4	4:0:0:0	100
4	18CSI34	Analog and Digital Electronics (IC)	CSE / ISE	4	3:0:0:0	100
5	18CSI35X	Foundation Elective-I (IC)	CSE / ISE	4	3:0:0:0	100
6	18CSL36	Data Structures Laboratory	CSE / ISE	2	1:0:2:0	100
7	18CSH37	Career Skill Development Programme	S & H	2	1:0:2:0	100
8	18CPH38	Constitution of India and Professional Ethics and Human Rights	S & H	1	1:0:0:0	100
		<b>Total</b>		<b>25</b>	<b>20:2:8:0</b>	<b>800</b>

**Foundation Elective-I (IC)**

Sl. No.	Course Code	Course
1	18CSI351	Design of Dynamic Web Pages
2	18CSI352	Fundamentals of Multimedia
3	18CSI353	Unix and Shell Programming

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study

### Fourth Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	Total Credits	L-T-P-S (Hrs/week)	Marks
1	18CSM41	Statistics and Probability Using R (IC)	CSE/ISE	4	3:0:2:0	100
2	18CST42	Design and Analysis of Algorithms	CSE/ISE	4	4:0:0:0	100
3	18CST43	Computer Organization and Architecture	CSE/ISE	4	4:0:0:0	100
4	18CSI44X	Foundation Elective-II (IC)	CSE/ISE	4	3:0:2:0	100
5	18EET45X	Engineering Elective-III	CSE/ISE	4	4:0:0:0	100
6	18CSL46	Design and Analysis of Algorithms Laboratory	CSE/ISE	2	1:0:2:0	100
7	18CSH47	Technical Report Writing & IRDP	S&H	2	1:0:2:0	100
8	18KAK38 / 18KAK38	Vyavaharika Kannada / Adalitha Kannada	S&H	1	1:0:0:0	100
<b>Total</b>				<b>25</b>	<b>21:0:8:0</b>	<b>800</b>

### Foundation Elective-II (IC)

Sl. No.	Course Code	Course
1	18CSI441	Introduction to Embedded Processors
2	18CSI442	Cloud Computing and Virtualization
3	18CSI443	Object Oriented programming using JAVA (IC)

### Engineering Elective-III

Sl. No.	Course Code	Course
1	18EET451	Renewable Energy Sources
2	18 EET452	Introduction to Cyber Security and Cyber Laws
3	18 EET453	Management Information Systems
4	18EET454	Environmental Air Pollution

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study



**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System CBCS**

***Outcome Based Education Curriculum***

**2018-2019**

Department of Computer Science and Engineering

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, Venkatagirikote Post, Devanahalli taluk,  
Bangalore district - 562 164

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**III & IV Semesters**

***Scheme and Syllabus***

***With effect from Academic Year 2018-19***

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### **PO2: Problem Analysis:**

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### **PO3: Design/Development of Solutions:**

Design solutions for complex **Computer Science and Engineering** problems and design system components or processes that meet the specified needs with appropriate

consideration for the public health and safety, and the cultural, societal, and environmental considerations.

#### **PO4: Conduct investigations of Complex problems:**

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions related to **Computer Science and Engineering** problems.

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#### **PO6: The Engineer and Society:**

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#### **PO7: Environment and Sustainability:**

Understand the impact of the professional **Computer Science and Engineering** solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

#### **PO8: Ethics:**

Apply ethical principles and commit to professional ethics and responsibilities and norms of the **Computer Science and Engineering** practice.

#### **PO9: Individual and Team work:**

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

#### **PO10: Communication:**

Communicate effectively on complex **Computer Science and Engineering** activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### **PO11: Project Management and Finance:**

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage **Computer Science and Engineering** projects and in multidisciplinary environments.

### **PO12: Life Long Learning:**

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## **PROGRAM SPECIFIC OUTCOMES (PSOs):**

Program Specific Outcomes (PSOs) are what the graduates of a specific undergraduate engineering program should be able to do at the time of graduation.

### **PSO1: Professional Skills:**

The ability to understand, analyze and develop computer programs in the areas related to system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying complexity.

### **PSO2: Problem-Solving Skills:**

The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.

### **PSO3: Foundation of mathematical concepts:**

Ability to apply mathematical concepts to solve real world problems using appropriate datastructure and suitable algorithms.

Sl. No.	Course Code	Course	Teaching Dept.	Total Credits	L:T:P:S (Hrs/week)	Marks
1	18CSM31	Integral Transforms & Applications (IC)	Maths	4	3:0:2:0	100
2	18CST32	Fundamentals of Computation Engineering	CSE / ISE	4	4:0:0:0	100
3	18CST33	Data Structures using C	CSE / ISE	4	4:0:0:0	100
4	18CSI34	Analog and Digital Electronics (IC)	CSE / ISE	4	3:0:2:0	100
5	18CSI35X	Foundation Elective - I (IC)	CSE / ISE	4	3:0:2:0	100
6	18CSL36	Data Structures Laboratory	CSE / ISE	2	1:0:2:0	100
7	18CSH37	Career Skill Development Programme	S & H	2	1:2:0:0	100
8	18CPH38	Constitution of India and Professional Ethics and Human Rights	S & H	1	1:0:0:0	100
		<b>Total</b>		<b>25</b>	<b>20:2:8:0</b>	<b>800</b>

### Foundation Elective - I (IC)

Sl. No.	Course Code	Course
1	18CSI351	Design of Dynamic Web Pages
2	18CSI352	Fundamentals of Multimedia
3	18CSI353	Unix and Shell Programming

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study

**Fourth Semester B.E. - Scheme**

Sl. No.	Course Code	Course	Teaching Dept.	Total Credits	L:T:P:S (Hrs/week)	Marks
1	18CSM41	Statistics and Probability Using R (IC)	Maths	4	3:0:2:0	100
2	18CST42	Design and Analysis of Algorithms	CSE/ISE	4	4:0:0:0	100
3	18CST43	Computer Organization and Architecture	CSE/ISE	4	4:0:0:0	100
4	18CSI44X	Foundation Elective - II (IC)	CSE/ISE	4	3:0:2:0	100
5	18EET45X	Engineering Elective - III	CSE/ISE	4	4:0:0:0	100
6	18CSL46	Design and Analysis of Algorithms Laboratory	CSE/ISE	2	1:0:2:0	100
7	18CSH47	Technical Report Writing & IRDP	S&H	2	1:0:2:0	100
8	18KAK38 / 18KAK38	Vyavaharika Kannada / Adalitha Kannada	S&H	1	1:0:0:0	100
<b>Total</b>				<b>25</b>	<b>21:0:8:0</b>	<b>800</b>

**Foundation Elective - II (IC)**

Sl. No.	Course Code	Course
1	18CSI441	Introduction to Embedded Processors
2	18CSI442	Cloud Computing and Virtualization
3	18CSI443	Object Oriented programming using JAVA (IC)

**Engineering Elective - III**

Sl. No.	Course Code	Course
1	18EET451	Renewable Energy Sources
2	18EET452	Introduction to Cyber Security and Cyber Laws
3	18EET453	Management Information Systems
4	18EET454	Environmental Air Pollution

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study



**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System CBCS**

***Outcome Based Education Curriculum***

**2018-2019**

Department of Computer Science and Engineering

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, Venkatagirikote Post, Devanahalli taluk,  
Bangalore district - 562 164

  
**PRINCIPAL**

Nagarjuna College of Engineering & Technology  
Devanahalli (Tq) Bengaluru (Dt.)-Pin: 562164



**NAGARJUNA**

**COLLEGE OF ENGINEERING & TECHNOLOGY**

*An Autonomous College under VTU*

**DEPARTMENT OF COMPUTER SCIENCE  
& ENGINEERING**

**VISION**

Excellence in creating globally competent professionals and moulding them as leaders in Computer Science & Engineering education and research.

**MISSION**

- M1:** Maintaining excellence in Computer Science & Engineering education through academic professionalism, teaching, curricula which reflect the changing needs of the society.
- M2:** Establishing centre of excellence by creating knowledge through research and industrial exposure in the area of Computer Science & Engineering.
- M3:** Developing communication skill, leadership qualities, team work & skills for continuing education among the students.
- M4:** Inculcating ethics, human values and skills for solving societal problems and environmental protection.
- M5:** Validate engineering knowledge through innovative research projects to enhance their employability and entrepreneurship skills.

**V to VIII Semesters**

***Scheme and Syllabus***

***With effect from Academic Year 2018-19***



**Fifth Semester B.E. – Scheme**

Sl. No.	Course Code	Course Name	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16CST51	Computer Networks	CS	3-0-0-0	3	100
2	16CSI52	Microcontrollers (IC)	CS/EC	3-0-2-0	4	100
3	16CST53	Operating Systems	CS	3-0-0-0	3	100
4	16CST54	Software Engineering and Testing	CS	3-0-0-0	3	100
5	16CSI55X	Foundation Elective-IV (IC)	CS	3-0-2-0	4	100
6	16CST56X	Engineering Elective-V /PBL	CS	3-0-0-0	3	100
7	16CSL57	Computer Networks Laboratory	CS	1-0-2-0	2	100
8	16CSL58	Operating Systems Laboratory	CS	1-0-2-0	2	100
9	16CSH59	General Aptitude	CS/BS&H	2-0-0-0	2	100
		<b>Total</b>		<b>22-0-8-0</b>	<b>26</b>	<b>900</b>

**Foundation Elective-IV (IC)**

Sl. No.	Course Code	Course Name
1	16CSI551	Advanced Algorithms
2	16CSI552	Object Oriented Programming with JAVA
3	16CSI553	Computer Graphics

**Engineering Elective-V / PBL**

Sl. No.	Course Code	Course Name
1	16CST561	Operations Research
2	16CST562	Computer Forensics (MOOCS)
3	16CST563	The Data Scientist's Toolbox (Certificate Course) Johns Hopkins University

**Sixth Semester B.E. – Scheme**

Sl. No.	Course Code	Course Name	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16CST61	Unix System Programming	CS	3-0-0-0	3	100
2	16CST62	System Software	CS	3-0-0-0	3	100
3	16CSI63	Embedded Systems (IC)	CS	3-0-2-0	4	100
4	16CSI64X	Foundation Elective-VI (IC)	CS	3-0-2-0	4	100
5	16CST65X	Engineering Elective-VII /PBL	CS	3-0-0-0	3	100
6	16HOE66X	Open Elective-VIII	CS/BS&H	2-0-0-4	3	100
7	16CSL67	Unix System Programming Laboratory	CS	1-0-2-0	2	100
8	16CSH68	Technical Aptitude and GD	CS/BS&H	2-0-0-0	2	100
9	16CSP69	Mini Project and Seminar	CS	1-0-2-0	2	100
		<b>Total</b>		<b>21-0-8-4</b>	<b>26</b>	<b>900</b>

**Foundation Elective-VI (IC)**

Sl. No.	Course Code	Course Name
1	16CSI641	Data Mining
2	16CSI642	Database Concepts
3	16CSI643	Soft Computing

**Engineering Elective-VII / PBL**

Sl. No.	Course Code	Course Name
1	16CST651	Artificial Intelligence
2	16CST652	Network Security (MOOCS)
3	16CST653	Operations Analytics (Certificate Course) Wharton University of Business

**Open Elective-VIII**

Sl. No.	Course Code	Course
1	16HOE661	Lab View – Level 1
2	16HOE662	Yoga and Meditation
3	16HOE663	Martial Arts
4	16HOE664	Music (Carnatic Vocal / Instrumental)
5	16HOE665	Dance
6	16HOE666	Sports
7	16HOE667	Online Certification Courses from IITs / IISc / SWAYAM / EDX

**Seventh Semester B.E. – Scheme**

Sl. No.	Course Code	Course Name	Teaching Dept.	L-T-P-S (Hrs/ week)	Total Credits	Marks
1	16CSI71	Internet of Things (IoT) (IC)	CS	3-0-2-0	4	100
2	16CST72	Android Application Development	CS	2-0-0-0	2	100
3	16CSI73X	Foundation Elective-IX (IC)	CS	3-0-2-0	4	100
4	16CST74X	Engineering Elective-X /PBL	CS	3-0-0-0	3	100
5	16HOE75X	Open Elective-XI	CS/BS&H/ ME	2-0-0-4	3	100
6	16HOE76X	Open Elective-XII	CS/BS&H	2-0-0-4	3	100
7	16CSL77	Information and Network Security Laboratory	CS	1-0-2-0	2	100
8	16CSL78	Android Application Development Laboratory	CS	1-0-2-0	2	100
9	16CSP79	Project Phase-I and Seminar	CS	0-0-6-0	3	100
	<b>Total</b>			<b>17-0-14-8</b>	<b>26</b>	<b>900</b>

**Foundation Elective - IX (IC)**

Sl. No.	Course Code	Course Name
1	16CSI731	Object Oriented Modeling and Designing
2	16CSI732	Big Data
3	16CSI733	Web Technologies – Servlet, JSP

**Engineering Elective - X / PBL**

Sl. No.	Course Code	Course Name
1	16CST741	System Modeling and Simulation
2	16CST742	C# and .Net (MOOCS)
3	16CST743	Managing Big Data with MySQL (Certificate Course), Duke University

**Open Elective - XI**

Sl. No.	Course Code	Course Name
1	16HOE751	Tax Management
2	16HOE752	Assessment of Building Energy Performance (Offered by ASHRAE)
3	16HOE753	National Disaster Management and Mitigation
4	16HOE754	Certification Course (Online)

**Open Elective - XII**

Sl. No.	Course Code	Course Name
1	16HOE761	Small & Medium Enterprise Management
2	16HOE762	Occupational Safety and Health Administration
3	16HOE763	Animation and Multimedia Engineering
4	16HOE764	Certification Course (Online)

**Eighth Semester B.E. – Scheme**

Sl. No.	Course Code	Course Name	Teaching Dept.	Total Credits	Marks
1	16CSP81	Project Phase-II	CS	4	100
2	16CSP82	Project Phase-III	CS	4	100
3	16CSP83	Evaluation and Viva-voce (External)	CS	10	100
	<b>Total</b>			<b>18</b>	<b>300</b>

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study



**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System CBCS**

***Outcome Based Education Curriculum***

***2015-2016***

Department of Computer Science and Engineering

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, Venkatagirikote Post, Devanahalli taluk,  
Bangalore district - 562 164



**NAGARJUNA**

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***An Autonomous College under VTU***

**VISION**

**Leadership and Excellence in Education.**

**MISSION**

**To fulfill the vision by imparting total quality education replete with the philosophy of blending human values and academic professionalism.**

***DEPARTMENT OF COMPUTER SCIENCE  
& ENGINEERING***

***III & IV Semesters***

***Scheme and Syllabus***

***With effect from Academic Year***

***2015 -16***

## **PROGRAM EDUCATIONAL OBJECTIVES (PEOs)**

The graduates of Computer Science and Engineering are expected to fulfill the following PEOs after a few years of their graduation.

**PEO1:** Graduates in Computer Science and Engineering will apply the technical knowledge of analysis and design of software used for sustainable societal growth.

**PEO2:** Graduates of Computer Science and Engineering will demonstrate logical thinking and programming skills.

**PEO3:** Graduates in Computer Science and Engineering will demonstrate good communication skills, dynamic leadership qualities with concern for environmental protection.

**PEO4:** Computer Science and Engineering graduates will be capable of pursuing higher studies, take up research and development work blended with ethics and human values.

**PEO5:** Computer Science and Engineering graduates will have the ability to become entrepreneurs there by switching over from responsive engineer to creative engineer.

## **PROGRAM OUTCOMES (POs):**

Graduates of the Computer Science and Engineering Programme will be able to achieve the following POs:

### **PO1: Engineering Knowledge:**

Apply the knowledge of mathematics, science, engineering fundamentals, and **Computer Science and Engineering** principles to the solution of complex problems in **Computer Science and Engineering**.

### **PO2: Problem Analysis:**

Identify, formulate, research literature, and analyze complex **Computer Science and Engineering** problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.

### **PO3: Design/Development of Solutions:**



Design solutions for complex **Computer Science and Engineering** problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4: Conduct investigations of Complex problems:**

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions related to **Computer Science and Engineering** problems.

**PO5: Modern Tool Usage:**

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex **Computer Science and Engineering** activities with an understanding of the limitations.

**PO6: The Engineer and Society:**

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional **Computer Science and Engineering** practice.

**PO7: Environment and Sustainability:**

Understand the impact of the professional **Computer Science and Engineering** solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO8: Ethics:**

Apply ethical principles and commit to professional ethics and responsibilities and norms of the **Computer Science and Engineering** practice.

**PO9: Individual and Team work:**

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10: Communication:**

Communicate effectively on complex **Computer Science and Engineering** activities with the engineering community and with society at large, such as, being able to

comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### **PO11: Project Management and Finance:**

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage **Computer Science and Engineering** projects and in multidisciplinary environments.

### **PO12: Life Long Learning:**

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## **PROGRAM SPECIFIC OUTCOMES (PSOs):**

Program Specific Outcomes (PSOs) are what the graduates of a specific undergraduate engineering program should be able to do at the time of graduation.

### **PSO1: Professional Skills:**

The ability to understand, analyze and develop computer programs in the areas related to system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying complexity.

### **PSO2: Problem-Solving Skills:**

The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.

### **PSO3: Foundation of mathematical concepts:**

Ability to apply mathematical concepts to solve real world problems using appropriate datastructure and suitable algorithms.

**Third Semester B.E. - Scheme**

Sl. No	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	15CSM31	Engineering Mathematics-III (IC)	Mathematics	3-0-2-0	4	100
2	15CST32	Fundamentals of Computation Engineering	CSE	3-0-0-0	3	100
3	15CSI33	Data Structures with C (IC)	CSE	3-0-2-4	5	100
4	15CST34	Analog and Digital Electronics	CSE	3-0-0-0	3	100
5	15CST35	Computer Organization	CSE	3-0-0-0	3	100
6	15CSI36X	Foundation Elective-I (IC)	CSE	2-0-2-0	3	100
7	15CSL37	Analog and Digital Electronics Laboratory	CSE	1-0-2-0	2	100
8	15CSI38	Virtualization Foundations (IC)	CSE	1-0-2-0	2	100
9	15CSH39	Soft Skills Development	CSE	0-2-0-0	1	100
Total				19-2-10-4	26	900

**Foundation Elective-I (IC)**

Sl. No	Course Code	Course
1	15CSI361	Computer Communication and Networking
2	15CSI362	Creating Interactive and Responsive Web Pages
3	15CSI363	Principles of Programming

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study

**Fourth Semester B.E. - Scheme**

Sl. No	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	15CSM41	Engineering Mathematics-IV (IC)	Mathematics	3-0-2-0	4	100
2	15CST42	Formal Languages and Automata Theory	CSE	3-0-0-0	3	100
3	15CST43	Design and Analysis of Algorithms	CSE	3-0-0-0	3	100
4	15CSI44	Microprocessors (IC)	CSE	3-0-2-0	4	100
5	15CSI45X	Foundation Elective-II (IC)	CSE	3-0-2-0	4	100
6	15CST46X	Engineering Elective-III	CSE	3-0-0-0	3	100
7	15CSL47	Design and Analysis of Algorithms Laboratory	CSE	1-0-2-0	2	100
8	15CSI48	Cloud Computing Foundations (IC)	CSE	1-0-2-0	2	100
9	15CSH49	Soft Skills Development	CSE	0-2-0-0	1	100
Total				20-2-10-0	26	900

**Foundation Elective-II (IC)**

Sl. No	Course Code	Course
1	15CSI451	UNIX and Shell Programming
2	15CSI452	Object Oriented Programming with C++
3	15CSI453	Introduction to Programming using Python

**Engineering Elective-III**

Sl. No	Course Code	Course
1	15CST461	Introduction to Cyber Security and Cyber Laws
2	15CST462	Linear Integrated Circuits
3	15CST463	Control Systems

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study



**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System CBCS**

***Outcome Based Education Curriculum***

**2017-2018**

Department of Computer Science and Engineering

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- M4:** Inculcating ethics, human values and skills for solving societal problems and environmental protection.
- M5:** Validate engineering knowledge through innovative research projects to enhance their employability and entrepreneurship skills.

**V to VIII Semesters**

***Scheme and Syllabus***

***With effect from Academic Year 2017 -18***

**Fifth Semester B.E. – Scheme**

Sl. No.	Course Code	Course Name	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	15CST51	Computer Networks	CS	3-0-0-0	3	100
2	15CSI52	Microcontrollers (IC)	CS/EC	3-0-2-0	4	100
3	15CST53	Operating Systems	CS	3-0-0-0	3	100
4	15CST54	Software Engineering and Testing	CS	3-0-0-0	3	100
5	15CSI55X	Foundation Elective-IV (IC)	CS	3-0-2-0	4	100
6	15CST56X	Engineering Elective-V /PBL	CS	3-0-0-0	3	100
7	15CSL57	Computer Networks Laboratory	CS	1-0-2-0	2	100
8	15CSL58	Operating Systems Laboratory	CS	1-0-2-0	2	100
9	15CSH59	General Aptitude	CS/BS&H	2-0-0-0	2	100
		<b>Total</b>		<b>22-0-8-0</b>	<b>26</b>	<b>900</b>

**Foundation Elective-IV (IC)**

Sl. No.	Course Code	Course Name
1	15CSI551	Advanced Algorithms
2	15CSI552	Object Oriented Programming with JAVA
3	15CSI553	Computer Graphics

**Engineering Elective-V / PBL**

Sl. No.	Course Code	Course Name
1	15CST561	Operations Research
2	15CST562	Computer Forensics (MOOCS)
3	15CST563	The Data Scientist's Toolbox (Certificate Course) Johns Hopkins University



**Sixth Semester B.E. – Scheme**

Sl. No.	Course Code	Course Name	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	15CST61	Unix System Programming	CS	3-0-0-0	3	100
2	15CST62	System Software	CS	3-0-0-0	3	100
3	15CSI63	Embedded Systems (IC)	CS	3-0-2-0	4	100
4	15CSI64X	Foundation Elective-VI (IC)	CS	3-0-2-0	4	100
5	15CST65X	Engineering Elective-VII /PBL	CS	3-0-0-0	3	100
6	15HOE66X	Open Elective-VIII	CS/BS&H	2-0-0-4	3	100
7	15CSL67	Unix System Programming Laboratory	CS	1-0-2-0	2	100
8	15CSH68	Technical Aptitude and GD	CS/BS&H	2-0-0-0	2	100
9	15CSP69	Mini Project and Seminar	CS	1-0-2-0	2	100
		<b>Total</b>		<b>21-0-8-4</b>	<b>26</b>	<b>900</b>

**Foundation Elective-VI (IC)**

Sl. No.	Course Code	Course Name
1	15CSI641	Data Mining
2	15CSI642	Database Concepts
3	15CSI643	Soft Computing

**Engineering Elective-VII / PBL**

Sl. No.	Course Code	Course Name
1	15CST651	Artificial Intelligence
2	15CST652	Network Security (MOOCS)
3	15CST653	Operations Analytics (Certificate Course) Wharton University of Business

**Open Elective-VIII**

Sl. No.	Course Code	Course
1	15HOE661	Lab View – Level 1
2	15HOE662	Yoga and Meditation
3	15HOE663	Martial Arts
4	15HOE664	Music (Carnatic Vocal / Instrumental)
5	15HOE665	Dance
6	15HOE666	Sports
7	15HOE667	Online Certification Courses from IITs / IISc / SWAYAM / EDX



### Seventh Semester B.E. – Scheme

Sl. No.	Course Code	Course Name	Teaching Dept.	L-T-P-S (Hrs/ week)	Total Credits	Marks
1	15CSI71	Internet of Things (IoT) (IC)	CS	3-0-2-0	4	100
2	15CST72	Android Application Development	CS	2-0-0-0	2	100
3	15CSI73X	Foundation Elective-IX (IC)	CS	3-0-2-0	4	100
4	15CST74X	Engineering Elective-X /PBL	CS	3-0-0-0	3	100
5	15HOE75X	Open Elective-XI	CS/BS&H/ME	2-0-0-4	3	100
6	15HOE76X	Open Elective-XII	CS/BS&H	2-0-0-4	3	100
7	15CSL77	Information and Network Security Laboratory	CS	1-0-2-0	2	100
8	15CSL78	Android Application Development Laboratory	CS	1-0-2-0	2	100
9	15CSP79	Project Phase-I and Seminar	CS	0-0-6-0	3	100
	<b>Total</b>			<b>17-0-14-8</b>	<b>26</b>	<b>900</b>

### Foundation Elective - IX (IC)

Sl. No.	Course Code	Course Name
1	15CSI731	Object Oriented Modeling and Designing
2	15CSI732	Big Data
3	15CSI733	Web Technologies – Servlet, JSP

### Engineering Elective - X / PBL

Sl. No.	Course Code	Course Name
1	15CST741	System Modeling and Simulation
2	15CST742	C# and .Net (MOOCS)
3	15CST743	Managing Big Data with MySQL (Certificate Course), Duke University

**Open Elective - XI**

Sl. No.	Course Code	Course Name
1	15HOE751	Tax Management
2	15HOE752	Assessment of Building Energy Performance (Offered by ASHRAE)
3	15HOE753	National Disaster Management and Mitigation
4	15HOE754	Certification Course (Online)

**Open Elective - XII**

Sl. No.	Course Code	Course Name
1	15HOE761	Small & Medium Enterprise Management
2	15HOE762	Occupational Safety and Health Administration
3	15HOE763	Animation and Multimedia Engineering
4	15HOE764	Certification Course (Online)

**Eighth Semester B.E. – Scheme**

Sl. No.	Course Code	Course Name	Teaching Dept.	Total Credits	Marks
1	15CSP81	Project Phase-II	CS	4	100
2	15CSP82	Project Phase-III	CS	4	100
3	15CSP83	Evaluation and Viva-voce (External)	CS	10	100
	<b>Total</b>			<b>18</b>	<b>300</b>



**PRINCIPAL**

Nagarjuna College of Engineering & Technology  
 Devanahalli (Tq) Bengaluru (Dt.)-Pin: 562164

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study



**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System CBCS**

***Outcome Based Education Curriculum***

**2018-2019**

Department of Computer Science and Engineering

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, Venkatagirikote Post, Devanahalli taluk,  
Bangalore district - 562 164



**NAGARJUNA**

**COLLEGE OF ENGINEERING & TECHNOLOGY**

*An Autonomous College under VTU*

**DEPARTMENT OF COMPUTER SCIENCE  
& ENGINEERING**

**VISION**

Excellence in creating globally competent professionals and moulding them as leaders in Computer Science & Engineering education and research.

**MISSION**

- M1:** Maintaining excellence in Computer Science & Engineering education through academic professionalism, teaching, curricula which reflect the changing needs of the society.
- M2:** Establishing centre of excellence by creating knowledge through research and industrial exposure in the area of Computer Science & Engineering.
- M3:** Developing communication skill, leadership qualities, team work & skills for continuing education among the students.
- M4:** Inculcating ethics, human values and skills for solving societal problems and environmental protection.
- M5:** Validate engineering knowledge through innovative research projects to enhance their employability and entrepreneurship skills.

**III & IV Semesters**

***Scheme and Syllabus***

***With effect from Academic Year 2018-19***

## **PROGRAM EDUCATIONAL OBJECTIVES (PEOs)**

The graduates of Information Science and Engineering are expected to fulfill the following PEOs after a few years of their graduation.

**PEO1:** Pursue a successful career in the field of Information Science & Engineering or a related field utilizing his/her education and contribute to the profession as an excellent employee, or as an entrepreneur.

**PEO2:** Be able to work effectively in multidisciplinary environments and be responsible members/leaders of their communities

**PEO3:** The graduates of Information Science and Engineering Program should be able to establish an understanding of professionalism, teamwork, ethics, public policy that allows them to become good professional Engineers

**PEO4:** The graduates of Information Science and Engineering Program should be able to provide novel engineering solutions and efficient software designs with legal and ethical responsibility.

**PEO5:** Continuously improve by pursuing advanced degrees in engineering, business, or other professional fields through formal means or through informal self-study.

## **PROGRAM OUTCOMES (POs):**

Graduates of the Information Science and Engineering Programme will be able to achieve the following POs:

### **PO1: Engineering Knowledge:**

Apply the knowledge of mathematics, science, engineering fundamentals, and **Information Science and Engineering** principles to the solution of complex problems in **Information Science and Engineering**.

### **PO2: Problem Analysis:**

Identify, formulate, research literature, and analyze complex **Information Science and Engineering** problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.

### **PO3: Design/Development of Solutions:**

Design solutions for complex **Information Science and Engineering** problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

#### **PO4: Conduct investigations of Complex problems:**

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions related to **Information Science and Engineering** problems.

#### **PO5: Modern Tool Usage:**

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex **Information Science and Engineering** activities with an understanding of the limitations.

#### **PO6: The Engineer and Society:**

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional **Information Science and Engineering** practice.

#### **PO7: Environment and Sustainability:**

Understand the impact of the professional **Information Science and Engineering** solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

#### **PO8: Ethics:**

Apply ethical principles and commit to professional ethics and responsibilities and norms of the **Information Science and Engineering** practice.

#### **PO9: Individual and Team work:**

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

#### **PO10: Communication:**

Communicate effectively on complex **Information Science and Engineering** activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

#### **PO11: Project Management and Finance:**

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader

in a team, to manage **Information Science and Engineering** projects and in multidisciplinary environments.

**PO12: Life Long Learning:**

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**PROGRAM SPECIFIC OUTCOMES (PSOs):**

Program Specific Outcomes (PSOs) are what the graduates of a specific undergraduate engineering program should be able to do at the time of graduation.

**PSO1: Professional Skills:**

The ability to understand, analyze and develop algorithms and write Information application programs in the areas related to information technology

**PSO2: Problem-Solving Skills:**

Ability to understand the ethics, human values for solving societal problems and environmental protection

**PSO3: Foundation of mathematical concepts:**

Ability to understand the software development skills and practical knowledge for promoting research, higher studies and entrepreneurship.



### Third Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17CSM31	Engineering Mathematics-III (IC)	Mathematics	3-0-2-0	4	100
2	17CST32	Fundamentals of Computation Engineering	CSE	3-0-0-0	3	100
3	17CSI33	Data Structures with C (IC)	CSE	4-0-2-0	5	100
4	17CST34	Analog and Digital Electronics	CSE	3-0-0-0	3	100
5	17CST35	Computer Organization	CSE	3-0-0-0	3	100
6	17CSI36X	Foundation Elective-I (IC)	CSE	2-0-2-0	3	100
7	17CSL37	Analog and Digital Electronics Laboratory	CSE	1-0-2-0	2	100
8	17CSI38	Virtualization Foundations (IC)	CSE	1-0-2-0	2	100
9	17CSH39	Integrated Rural Development – Part 1	CSE	0-2-0-0	1	100
		<b>Total</b>		<b>20-2-10-0</b>	<b>26</b>	<b>900</b>

#### Foundation Elective-I (IC)

Sl. No.	Course Code	Course
1	17CSI361	Computer Communication and Networking
2	17CSI362	Creating Interactive and Responsive Web Pages
3	17CSI363	Principles of Programming

IC – Integrated Course

L – Lecture

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S – Self Study

### Fourth Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17CSM41	Engineering Mathematics-IV (IC)	Mathematics	3-0-2-0	4	100
2	17CST42	Formal Languages and Automata Theory	CSE	3-0-0-0	3	100
3	17CST43	Design and Analysis of Algorithms	CSE	3-0-0-0	3	100
4	17CSI44	Microprocessors (IC)	CSE	3-0-2-0	4	100
5	17CSI45X	Foundation Elective-II (IC)	CSE	3-0-2-0	4	100
6	17CST46X	Engineering Elective-III	CSE	3-0-0-0	3	100
7	17CSL47	Design and Analysis of Algorithms Laboratory	CSE	1-0-2-0	2	100
8	17CSI48	Cloud Computing Foundations (IC)	CSE	1-0-2-0	2	100
9	17CSH49	Integrated Rural Development – Part 2	CSE	0-2-0-0	1	100
<b>Total</b>				<b>20-2-10-0</b>	<b>26</b>	<b>900</b>

#### Foundation Elective-II (IC)

Sl. No.	Course Code	Course
1	17CSI451	Unix and Shell Programming
2	17CSI452	Fundamentals of Multimedia
3	17CSI453	Introduction to Programming using Python

#### Engineering Elective-III

Sl. No.	Course Code	Course
1	17CST461	Introduction to Cyber Security and Cyber Laws
2	17CST462	Linear Integrated Circuits
3	17CST463	Control Systems

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study

### Fifth Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16IST51	Computer Networks	IS	3-0-0-0	3	100
2	16IST52	Microcontrollers	IS	3-0-0-0	3	100
3	16ISI53	Operating System (IC)	IS	3-0-2-0	4	100
4	16IST54	Software Engineering and Testing	IS	3-0-0-0	3	100
5	16ISI55X	Foundation Elective-IV(IC)	IS	3-0-2-0	4	100
6	16IST56X	Engineering Elective-V	IS	3-0-0-0	3	100
7	16ISL57	Computer Networks Laboratory	IS	1-0-2-0	2	100
8	16ISL58	Microcontroller Laboratory	IS	1-0-2-0	2	100
9	16ISH59	General Aptitude	IS/BS&H	2-0-0-0	2	100
<b>TOTAL</b>				<b>22-0-8-0</b>	<b>26</b>	<b>900</b>

#### Foundation Elective-IV (IC)

Sl. No.	Course Code	Course
1	16ISI551	Advanced Algorithms
2	16ISI552	Object Oriented Programming with JAVA
3	16ISI553	Compiler Design(NPTEL/MOOCs)

#### Engineering Elective-V / PBL

Sl. No.	Course Code	Course
1	16IST561	Operations Research
2	16IST562	Object Oriented Modeling and Design
3	16IST563	Computer Architecture (MOOCs)/ Information Security (MOOCs)

### Sixth Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16IST61	Unix System programming	IS	3-0-0-0	3	100
2	16ISI62	Android Programming (IC)	IS	3-0-2-0	4	100
3	16IST63	Embedded System	IS	3-0-0-0	3	100
4	16ISI64X	Foundation Elective-VI (IC)	IS	3-0-2-0	4	100
5	16IST65X	Engineering Elective-VII	IS	3-0-0-0	3	100
6	16HOE66X	Open Elective-VIII	IS/BS&H	2-0-0-4	3	100
7	16ISL67	Unix System programming Laboratory	IS	1-0-2-0	2	100
8	16ISH68	Technical Aptitude and GD	IS/BS&H	2-0-0-0	2	100
9	16ISP69	Mini project and Seminar	IS	2-0-0-0	2	100
<b>Total</b>				<b>22-0-6-4</b>	<b>26</b>	<b>900</b>

#### Foundation Elective-VI (IC)

Sl. No.	Course Code	Course
1	16ISI641	Distributed Computing System
2	16ISI642	Database Concepts
3	16ISI643	Computer Graphics and Multimedia

#### Engineering Elective-VII / PBL

Sl. No.	Course Code	Course
1	16IST651	Data Mining
2	16IST652	Artificial Intelligence
3	16IST653	Introduction to CSS3 (MOOCS)

#### Open Elective-VIII

Sl. No.	Course Code	Course
1	16HOE661	Lab View – Level 1
2	16HOE662	Yoga and Meditation
3	16HOE663	Martial Arts
4	16HOE664	Music (Carnatic Vocal / Instrumental)
5	16HOE665	Dance
6	16HOE666	Sports
7	16HOE667	Online Certification Courses from IITs / IISc / SWAYAM / EDX

### Seventh Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16IST71	Internet of Things	IS	3-0-0-0	3	100
2	16IST72	Image Processing	IS	3-0-0-0	3	100
3	16ISI73X	Foundation Elective-IX (IC)	IS	3-0-2-0	4	100
4	16IST74X	Engineering Elective-X	IS	3-0-0-0	3	100
5	16HOE75X	Open Elective-XI	IS/BS&H/ME	2-0-0-4	3	100
6	16HOE76X	Open Elective-XII	IS/BS&H	2-0-0-4	3	100
7	16ISL77	Internet of Things Laboratory	IS	1-0-2-0	2	100
8	16ISL78	Image processing Laboratory	IS	1-0-2-0	2	100
9	16ISP79	Project Phase-I and Seminar	IS	0-0-6-0	3	100
		<b>Total</b>		<b>18-0-12-8</b>	<b>26</b>	<b>900</b>

#### Foundation Elective-IX (IC)

Sl. No.	Course Code	Course
1	16ISI731	Soft Computing
2	16ISI732	Big Data
3	16ISI733	Web Technologies – Servlet, JSP

#### Engineering Elective-X / PBL

Sl. No.	Course Code	Course
1	16IST741	System Modeling and Simulation
2	16IST742	Machine Learning (NPTEL/MOOCs)
4	16IST743	Project Planning and Control (MOOCs)

#### Open Elective-XI

Sl. No.	Course Code	Course
1	16HOE751	Tax Management
2	16HOE752	Assessment of Building Energy Performance (Offered by ASHRAE)
3	16HOE753	National Disaster Management and Mitigation
4	16HOE754	Online certification courses from IITs/IISc/SWAYAM/EDX

#### Open Elective-XII

Sl. No.	Course Code	Course
1	16HOE761	Small and Medium Enterprise Management
2	16HOE762	Occupational Safety and Health Administration
3	16HOE763	Animation and Multimedia Engineering
4	16HOE764	Online certification courses from IITs / IISc / SWAYAM / EDX

**Eighth Semester B.E. – Scheme**

Sl. No.	Course Code	Course Name	Teaching Dept.	Total Credits	Marks
1	16ISP81	Project Phase-II	IS	4	100
2	16ISP82	Project Phase-III	IS	4	100
3	16ISP83	Evaluation and Viva-voce (External)	IS	10	100
		<b>Total</b>		<b>18</b>	<b>300</b>

IC – Integrated Course

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**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

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***Outcome Based Education Curriculum***

**2019-2020**

Department of Civil Engineering

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, Venkatagirikote Post, Devanahalli taluk,  
Bangalore district - 562 164



**NAGARJUNA**

**COLLEGE OF ENGINEERING & TECHNOLOGY**

*An Autonomous College under VTU*

## **DEPARTMENT OF CIVIL ENGINEERING**

### **VISION**

To transform the students as leaders in Civil Engineering to achieve professional excellence in the challenging future.

### **MISSION**

**M1:** To provide the Civil Engineering knowledge and skills for students through an excellent academic environment.

**M2:** Adopting innovative teaching techniques using modern engineering tools for designing, modeling and analyzing the societal and environmental problems.

**M3:** Developing Communication skill, leadership qualities through teamwork and skills for continuing education among the students.

**M4:** To inculcate moral, ethical and professional values among students to serve the society.

**M5:** Validate engineering knowledge through



innovative research projects to enhance their employability and entrepreneurship skills.

### **Program Educational Objectives (PEOs)**

- **PEO1:** Graduates in Civil Engineering will apply the technical knowledge for sustainable societal growth.
- **PEO2:** Graduates of civil Engineering will demonstrate designing, modeling and analyzing skills.
- **PEO3:** Graduates in Civil Engineering will demonstrate good communication skills, dynamic leadership qualities with concern for environmental protection.
- **PEO4:** Civil Engineering graduates will be capable of pursuing higher studies, take up research and development work blended with ethics and human values.
- **PEO5:** Civil engineering graduates will have the ability to become entrepreneurs thereby switching over from responsive engineering to creative engineering.

### **Program Outcomes (POs)**

- **PO-1:** Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and Civil Engineering principles to the solution of complex problems in Civil Engineering.

- **PO-2:** Problem Analysis: Identify, formulate, research literature and analyze complex Civil Engineering problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.
- **PO-3:** Design/Development of Solutions: Design solutions for complex Civil Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.
- **PO-4:** Conduct Investigations of Complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions related to Civil Engineering problems.
- **PO-5:** Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering tools such as CAD, FEM, GIS, etc. including prediction and modeling to complex Civil Engineering activities with an understanding of the limitations.
- **PO-6:** The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent

responsibilities relevant to the professional Civil Engineering practice.

- **PO-7:** Environment and Sustainability: Understand the impact of the professional Civil Engineering solutions in societal and environmental contexts and demonstrate the knowledge and the need for sustainable development.
- **PO-8:** Ethics: Apply ethical principles and commit to professional ethics and responsibilities while following the Civil Engineering practice.
- **PO-9:** Individual and Team work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.
- **PO-10:** Communication: Communicate effectively on complex Civil Engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO-11:** Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a

team, to manage Civil Engineering projects and in multidisciplinary environments.

- **PO-12:** Life Long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### **Program Specific Outcome (PSO)**

- **PSO-1:** Apply the knowledge of Civil Engineering in Sustainable Infrastructure developments.
- **PSO-2:** Identify, analyze and manage Civil Engineering problems with ethical and social responsibilities.
- **PSO-3:** Implementation of relevant codes/ specifications/ guidelines to arrive at comprehensive solutions to address societal needs and exhibit communication and teamwork skills.

## **III & IV Semesters**

### ***Scheme and Syllabus***

***With effect from Academic Year 2019-20***

### Third Semester B.E. - Scheme

Sl. No.	Course Code	Course Name	Teaching Dept.	Total Credits	L:T:P:S (Hrs/week)	Marks
1	18CVM31	Integral Transforms And Fourier Series (IC)	Maths	4	3:0:2:0	100
2	18CVT32	Building Materials and Concrete Technology	CE	4	4:0:0:0	100
3	18CVT33	Strength of Materials	CE	4	3:2:0:0	100
4	18CVI34	Engineering Geology (IC)	CE	4	3:0:2:0	100
5	18CVT35X	Foundation Elective - I	CE	4	4:0:0:0	100
6	18CVL36	Basic Material Testing Laboratory	CE	2	1:0:2:0	100
7	18CVH37	Technical Report Writing & IRDP	S&H	2	1:0:2:0	100
8	18KAK38	Aadalitha Kannada / Vyavaharika Kannada	S&H	1	1:0:0:0	100
TOTAL				25	20:2:8:0	800

### Foundation Elective - I

Sl. No.	Course Code	Course
1	18CVT351	Ecology and Environmental Impact Assessment
2	18CVT352	Building Services
3	18CVT353	Construction Techniques and Practices

IC – Integrated Course

L – Lecture

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## Fourth Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept	Total Credits	L:T:P:S (Hrs/ week)	Marks
1	18CVM41	Calculus of Complex Functions And Probability Distributions(IC)	Maths	4	3:0:2:0	100
2	18CVI42	Surveying (IC)	CE	4	3:0:2:0	100
3	18CVT43	Structural Analysis - I	CE	3	3:0:0:0	100
4	18CVT44X	Foundation Elective - II	CE	3	3:0:0:0	100
5	18EET45X	Engineering Elective - III	CE	4	4:0:0:0	100
6	18CVI46	Building Planning and Drawing (IC)	CE	4	3:0:2:0	100
7	18CVH47	Career Skill Development Programme	S&H	2	1:2:0:0	100
8	18CPH48	Constitution of India , Professional Ethics and Human Rights	S&H	1	1:0:0:0	100
<b>TOTAL</b>				<b>25</b>	<b>21:2:6:0</b>	<b>800</b>

### Foundation Elective - II

Sl. No.	Course Code	Course
1	18CVT441	Alternative Building Material And Technology
2	18CVT442	Advanced Concrete Technology
3	18CVT443	Green Buildings

### Engineering Elective - III

Sl. No.	Course Code	Course
1	18EET451	Renewable Energy Resources
2	18EET452	Introduction to Cyber Security and Cyber Laws
3	18EET453	Management Information System
4	18EET454	Environmental Air Pollution

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study

### Fifth Semester B.E. - Scheme

Sl. No	Course Code	Course	Teaching Department	L-T-P-S (Hrs/week)	Total Credits	Marks
1	18CVI51	Transportation Engineering (IC)	CE	3-0-2-0	4	100
2	18CVI52	Fluid Mechanics (IC)	CE	3-0-2-0	4	100
3	18CVT53X	Foundation Elective – IV	CE	4-0-0-0	4	100
4	18EET54X	Engineering Elective – V	CE	4-0-0-0	4	100
5	18CVT55	Structural Analysis-II	CE	3-0-0-0	3	100
6	18CVL56	Cad Lab.	CE	1-0-2-0	2	100
7	18CVH57	General Aptitude	CE	2-0-0-0	2	100
8	18CVT58	Environment Science	CE	1-0-0-0	1	100
Total				21-0-6-0	24	800

Foundation Elective – IV		
Sl. No	Course Code	Course
1	18CVT531	Railways, Harbours & Tunnels
2	18CVT532	Hydrology and Irrigation Engineering
3	18CVT533	Natural Disaster Mitigation and Management
4	18CVT534	Construction Management and Engineering Economics
5	18CVT535	Design of Masonry Structures
6	18CVT536	Rural Water Supply and Sanitation

Engineering Elective – V		
Sl. No	Course Code	Course
1	18 EET 541	Solid Waste Management(CV)
2	18 EET 542	Modeling of Residential Building using AI(CSE)
3	18 EET 543	Metal Forming Process (ME)
4	18 EET 544	C <sup>++</sup> (EC)
5		

IC – Integrated Course	L - Lecture	T - Tutorials	P - Practical	S - Self Study
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## Sixth Semester B.E. - Scheme

Sl. No	Course Code	Course	Teaching Department	L-T-P-S (Hrs/week)	Total Credits	Marks
1	18CVI61	Limit State Design of Reinforced Concrete & Steel Structures (IC)	CE	3-0-2-0	4	100
2	18CVT62	Geotechnical Engineering	CE	4-0-0-0	4	100
3	18CVI63	Environmental Engineering (IC)	CE	3-0-2-0	4	100
4	18CVT64X	Foundation Elective -VI	CE	3-0-0-0	3	100
5	18EET65X	Engineering Elective –VII	CE	4-0-0-0	4	100
6	18HOE66X	Open Electives-VIII	CE	2-0-0-0	2	100
7	18CVL67	Extensive Survey Camp	CE	1-0-2-0	2	100
8	18CVH68	Technical Aptitude and GD	CE	1-0-0-0	1	100
Total				21-0-6-0	24	800

### Foundation Elective -VI

Sl. No	Courses Code	Course
1.	18CVT641	Pavements Materials & construction
2.	18CVT642	Traffic Engineering
3.	18CVT643	Hydraulics & Hydraulics Machineries
4.	18CVT644	Industrial Waste Water Treatment
5.	18CVT645	Repair and Rehabilitation of Structures
6.		

### Engineering Elective –VII

Sl. No	Course Code	Course
1	18 EET 651	Remote sensing & GIS (CV)
2	18 EET 652	Data-Driven Models for Early Prediction of Construction Time (CSE)
3	18 EET 653	Non Destructive Testing (ME)
4	18 EET 654	Python (EC)



<b>Open Elective – VIII</b>		
<b>Sl. No</b>	<b>Courses Code</b>	<b>Course Name</b>
1	18 HOE661	Lab View – Level 1
2	18 HOE 662	Yoga Meditation
3	18 HOE 663	Martial Arts
4	18 HOE 664	Music (Carnatic / Instrumental)
5	18 HOE 665	Dance
6	18 HOE 666	Sports
8	18 HOE 668	Basics of Photography
9	18 HOE 669	Online Certificate courses from NPTEL

<b>IC – Integrated Course</b>	<b>L - Lecture</b>	<b>T - Tutorials</b>	<b>P - Practical</b>	<b>S - Self Study</b>
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## Seventh Semester B E Scheme

Sl. No	Subject Code	Subject	Teaching Department	L-T-P-S (Hrs/week)	Total Credits	Marks
1	18 CVT71	Estimation and Valuation	CE	3-0-0-0	3	100
2	18 CVT72X	Foundation Elective- IX	CE	3-0-0-0	3	100
3	18EET73X	Engineering Elective – X	CE	3-0-0-0	3	100
4	18 HOE74X	Open Electives- XI	CE	3-0-0-0	3	100
5	18 HOE75X	Open Electives- XII	CE	3-0-0-0	3	100
6	18 CVL76	Concrete Laboratory	CE	1-0-2-0	2	100
7	18 CVL77	Geo Technical Engineering Lab	CE	1-0-2-0	2	100
8	18 CVP78	Project Phase I	CE	3-0-2-0	4	100
Total				20-0-6-0	23	800

Foundation Elective - IX		
Sl. No	Course Code	Course
1	18CVT721	Water Resources Engineering
2	18CVT722	Pavement and Highway Geometric Design
3	18CVT723	Pre Stressed Concrete Structures
4	18CVT724	Design and Detailing of RC and Steel Structures
5	18CVT725	Sub Surface Exploration and Ground Improvement Techniques.
6	18CVT726	Basics of Earthquake Engineering.

Engineering Elective - X		
Sl. No	Courses Code	Course
1	18 EET 731	Smart Cities and Application of IOT.(CV)
2	18 EET 732	Software and Computer Applications for Civil Engineering(CSE)
3	18 EET 733	Biomass Energy Systems(ME)
4	18 EET 734	AI&ML(EC)

<b>Open Elective - XI</b>		
<b>Sl. No</b>	<b>Courses Code</b>	<b>Course</b>
1	18HOE741	Tax Management
2	18HOE 742	Assessment of Building Energy Performance (Offered by ASHRAE)
3	18 HOE 743	Ground Water Hydrology
4	18 HOE 744	Online Certificate courses from IITs/IISc/SWAYAM
5	18HOE 745	Online Certificate courses from NPTEL

<b>Open Elective - XII</b>		
<b>Sl. No</b>	<b>Courses Code</b>	<b>Course</b>
1	18HOE 751	Small & Medium Enterprise Management
2	18 HOE 752	Animation & Multimedia Engineering
3	18 HOE 753	Basics of RS, GIS & GNSS

<b>IC – Integrated Course</b>	<b>L - Lecture</b>	<b>T - Tutorials</b>	<b>P - Practical</b>	<b>S - Self Study</b>
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## Eighth Semester B E Scheme

Sl. No	Subject Code	Subject	Teaching Department	L-T-P-S (Hrs/week)	Total Credits	Marks
1	18CVI81	Professional Practice / Internship	CE	2-0-2-0	3	100
2	18CVP82	Project Phase – II & III	CE	5-0-2-0	6	200
3	18CVP83	Evaluation and Viva Voce (External)	CE	3-0-2-0	4	100
4	18CVS84	Technical Seminar	CE	1-0-0-0	1	100
		Total		11-0-6-0	14	500

IC – Integrated Course	L - Lecture	T - Tutorials	P - Practical	S - Self Study
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**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System CBCS**

***Outcome Based Education Curriculum***

**2018-2019**

Department of Civil Engineering

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, Venkatagirikote Post, Devanahalli taluk,  
Bangalore district - 562 164



**NAGARJUNA**

**COLLEGE OF ENGINEERING & TECHNOLOGY**

*An Autonomous College under VTU*

## **DEPARTMENT OF CIVIL ENGINEERING**

### **VISION**

To transform the students as leaders in Civil Engineering to achieve professional excellence in the challenging future.

### **MISSION**

**M1:** To provide the Civil Engineering knowledge and skills for students through an excellent academic environment.

**M2:** Adopting innovative teaching techniques using modern engineering tools for designing, modeling and analyzing the societal and environmental problems.

**M3:** Developing Communication skill, leadership qualities through teamwork and skills for continuing education among the students.

**M4:** To inculcate moral, ethical and professional values among students to serve the society.

**M5:** Validate engineering knowledge through

innovative research projects to enhance their employability and entrepreneurship skills.

### **Program Educational Objectives (PEOs)**

- **PEO1:** Graduates in Civil Engineering will apply the technical knowledge for sustainable societal growth.
- **PEO2:** Graduates of civil Engineering will demonstrate designing, modeling and analyzing skills.
- **PEO3:** Graduates in Civil Engineering will demonstrate good communication skills, dynamic leadership qualities with concern for environmental protection.
- **PEO4:** Civil Engineering graduates will be capable of pursuing higher studies, take up research and development work blended with ethics and human values.
- **PEO5:** Civil engineering graduates will have the ability to become entrepreneurs thereby switching over from responsive engineering to creative engineering.

### **Program Outcomes (POs)**

- **PO-1:** Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and Civil Engineering principles to the solution of complex problems in Civil Engineering.

- **PO-2:** Problem Analysis: Identify, formulate, research literature and analyze complex Civil Engineering problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.
- **PO-3:** Design/Development of Solutions: Design solutions for complex Civil Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.
- **PO-4:** Conduct Investigations of Complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions related to Civil Engineering problems.
- **PO-5:** Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering tools such as CAD, FEM, GIS, etc. including prediction and modeling to complex Civil Engineering activities with an understanding of the limitations.
- **PO-6:** The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent



responsibilities relevant to the professional Civil Engineering practice.

- **PO-7:** Environment and Sustainability: Understand the impact of the professional Civil Engineering solutions in societal and environmental contexts and demonstrate the knowledge and the need for sustainable development.
- **PO-8:** Ethics: Apply ethical principles and commit to professional ethics and responsibilities while following the Civil Engineering practice.
- **PO-9:** Individual and Team work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.
- **PO-10:** Communication: Communicate effectively on complex Civil Engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO-11:** Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a

team, to manage Civil Engineering projects and in multidisciplinary environments.

- **PO-12:** Life Long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### **Program Specific Outcome (PSO)**

- **PSO-1:** Apply the knowledge of Civil Engineering in Sustainable Infrastructure developments.
- **PSO-2:** Identify, analyze and manage Civil Engineering problems with ethical and social responsibilities.
- **PSO-3:** Implementation of relevant codes/ specifications/ guidelines to arrive at comprehensive solutions to address societal needs and exhibit communication and teamwork skills.

## **III & IV Semesters**

### ***Scheme and Syllabus***

***With effect from Academic Year 2018-19***

### Third Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17CVM31	Engineering Mathematics-III (IC)	Mathematics	3-0-2-0	4	100
2	17CVT32	Building Materials and Concrete Technology	CE	3-0-0-0	3	100
3	17CVT33	Strength of Materials	CE	3-0-0-0	3	100
4	17CVT34	Surveying	CE	4-0-0-0	4	100
5	17CVI35	Engineering Geology (IC)	CE	3-0-2-0	4	100
6	17CVT36X	Foundation Elective-I	CE	3-0-0-0	3	100
7	17CVL37	Basic Material Testing Laboratory	CE	1-0-2-0	2	100
8	17CVL38	Surveying Practice-I	CE	1-0-2-0	2	100
9	17CVH39	Integrated Rural Development – Part 1	CE	0-2-0-0	1	100
Total				21-2-8-0	26	900

### Foundation Elective-I

Sl. No.	Course Code	Course
1	17CVT361	Ecology and Environmental Impact Assessment
2	17CVT362	Rural Water Supply and Sanitation
3	17CVT363	Solid Waste Management

## Fourth Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17CVM41	Engineering Mathematics-IV (IC)	Mathematics	3-0-2-0	4	100
2	17CVT42	Fluid Mechanics	CE	4-0-0-0	4	100
3	17CVT43	Structural Analysis-I	CE	3-0-0-0	3	100
4	17CVI44	Building Planning and Drawing (IC)	CE	3-0-2-0	4	100
5	17CVT45X	Foundation Elective-II	CE	3-0-0-0	3	100
6	17CVT46X	Engineering Elective-III	CE	3-0-0-0	3	100
7	17CVL47	Concrete Laboratory	CE	1-0-2-0	2	100
8	17CVL48	Surveying Practice-II	CE	1-0-2-0	2	100
9	17CVH49	Integrated Rural Development – Part 2	CE	0-2-0-0	1	100
<b>Total</b>				<b>21-2-8-0</b>	<b>26</b>	<b>900</b>

### Foundation Elective-II

Sl. No.	Course Code	Course
1	17CVT451	Elements of Construction Industry
2	17CVT452	Alternative Building Material And Technology
3	17CVT453	Advanced Concrete Technology
4	17CVT454	Online Certification Course, IIRS- ISRO certification. Equivalent to 36-40 hours approved by Department

### Engineering Elective-III

Sl. No.	Course Code	Course
1	17CVT461	Renewable Energy Resources
2	17CVT462	Environmental Air Pollution
3	17CVT463	Remote Sensing and GIS
4	17CVT464	Smart Materials

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study

**V to VIII Semesters**  
***Scheme and Syllabus***  
***With effect from Academic Year 2019-20***

## Fifth Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17CVI51	Transportation Engineering (IC)	CV	3:0:2:0	4	100
2	17CVT52	Structural Analysis-II	CV	3:0:0:0	3	100
3	17CVI53	Design of RCC Structural Elements (IC)	CV	3:0:2:0	4	100
4	17CVT54X	Foundation Elective-IV	CV	3:0:0:0	3	100
5	17CVT55X	Foundation Elective-V	CV	3:0:0:0	3	100
6	17CVT56X	Engineering Elective-VI / PBL	CV	3:0:0:0	3	100
7	17CVL57	Fluid Mechanics Lab	CV	1:0:2:0	2	100
8	17CVL58	Analysis and Design Lab-I	CV	1:0:2:0	2	100
9	17CVH59	General Aptitude	CV/BS&H	2:0:0:0	2	100
<b>Total</b>				<b>22:0:8:0</b>	<b>26</b>	<b>900</b>

### Foundation Elective – IV

Sl. No.	Course Code	Course
1	17CVT541	Construction Industry Practice-I
2	17CVT542	Advanced Fluid Mechanics
3	17CVT543	Traffic Engineering

### Foundation Elective – V

Sl. No.	Course Code	Course
1	17CVT551	Advanced Surveying
2	17CVT552	Construction Management and Engineering Economics
3	17CVT553	Online Certification courses from IITs / IISc / SWAYAM / EDX

### Engineering Elective – VI / PBL

Sl. No.	Course Code	Course
1	17CVT561	Green Buildings
2	17CVT562	Building Services
3	17CVT563	Hydrology and Irrigation Engineering

## Sixth Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17CVI61	Design of Steel Structures (IC)	CV	3:0:2:0	4	100
2	17CVT62	Geotechnical Engineering-I	CV	3:0:0:0	3	100
3	17CVI63	Environmental Engineering (IC)	CV	3:0:2:0	4	100
4	17CVT64X	Foundation Elective-VII	CV	3:0:0:0	3	100
5	17CVT65X	Engineering Elective-VIII / PBL	CV	3:0:0:0	3	100
6	17HOE66X	Open Elective-IX	CV/BS&H	2:0:0:4	3	100
7	17CVL67	Detailing of Structural Elements Lab	CV	1:0:2:0	2	100
8	17CVL68	Extensive Survey Camp	CV	1:0:2:0	2	100
9	17CVH69	Technical Aptitude and GD	CV/BS&H	2:0:0:0	2	100
<b>Total</b>				<b>21:0:8:4</b>	<b>26</b>	<b>900</b>

### Foundation Elective – VII

Sl. No.	Course Code	Course
1	17CVT641	Construction Industry Practice-II
2	17CVT642	Advanced Transportation Engineering
3	17CVT643	Earthquake Resistant Design of Structures

### Engineering Elective – VIII / PBL

Sl. No.	Course Code	Course
1	17CVT651	Pollution Control and Management
2	17CVT652	Water Resources Engineering
3	17CVT653	Pavement Materials and Construction

### Open Elective – IX

Sl. No.	Course Code	Course
1	17HOE661	Lab View – Level 1
2	17HOE662	Yoga and Meditation
3	17HOE663	Martial Arts
4	17HOE664	Music (Carnatic Vocal / Instrumental)
5	17HOE665	Dance
6	17HOE666	Sports
7	17HOE667	Online Certification Courses from IITs / IISc / SWAYAM / EDX



## Seventh Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17CVT71	Geotechnical Engineering-II (IC)	CV	3:0:2:0	4	100
2	17CVT72	Estimation and Valuation (IC)	CV	3:0:2:0	4	100
3	17CVT73X	Foundation Elective-X	CV	3:0:0:0	3	100
4	17CVT74X	Engineering Elective-XI / PBL	CV	3:0:0:0	3	100
5	17HOE75X	Open Elective-XII	CV/BS&H/ME	2:0:0:4	3	100
6	17HOE76X	Open Elective-XIII	CV/BS&H	2:0:0:4	3	100
7	17CVL77	Project Management Lab	CV	0-0-2-0	1	100
8	17CVL78	Analysis and Design Lab-II	CV	1:0:2:0	2	100
9	17CVP79	Project Phase-I	CV	1-0-4-0	3	100
<b>Total</b>				<b>18-0-12-8</b>	<b>26</b>	<b>900</b>

### Foundation Elective – X

Sl. No.	Course Code	Course
1	17CVT731	Construction Industry Practice-III
2	17CVT732	Pre-Stressed Concrete Structures
3	17CVT733	Pavement Design

### Engineering Elective – XI / PBL

Sl. No.	Course Code	Course
1	17CVT741	Fire safety and management
2	17CVT742	Fundamentals of Energy, Environment and climate change
3	17CVT743	Industrial Waste Water treatment

### Open Elective – XII

Sl. No.	Course Code	Course
1	17HOE751	Tax Management
2	17HOE752	Assessment of Building Energy Performance (Offered by ASHRAE)
3	17HOE753	Natural Disaster Mitigation and Management
4	17HOE754	Online Certification courses from IITs / IISc / SWAYAM / EDX

### Open Elective – XIII

Sl. No.	Course Code	Course
1	17HOE761	Small and Medium Enterprise Management
2	17HOE762	Occupational Safety and Health Administration
3	17HOE763	Animation and Multimedia Engineering
4	17HOE764	Online Certification courses from IITs / IISc / SWAYAM / EDX

### Eighth Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	Total Credits	Marks
1	17CVP81	Project Phase-II	CV	4	100
2	17CVP82	Project Phase-III	CV	4	100
3	17CVP83	Evaluation and Viva voce (External)	CV	10	100
		<b>Total</b>		<b>18</b>	<b>300</b>

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study



**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System CBCS**

***Outcome Based Education Curriculum***

***2017-2018***

Department of Civil Engineering

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, Venkatagirikote Post, Devanahalli taluk,  
Bangalore district - 562 164



***An Autonomous College under VTU***

**DEPARTMENT OF CIVIL  
ENGINEERING  
VISION**

To transform the students as leaders in Civil Engineering to achieve professional excellence in the challenging future.

**MISSION**

**M1:** To provide the Civil Engineering knowledge and skills for students through an excellent academic environment.

**M2:** Adopting innovative teaching techniques using modern engineering tools for designing, modeling and analyzing the societal and environmental problems.

**M3:** Developing 160 Communication skill,

leadership qualities through teamwork and skills for continuing education among the students.

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### **Program Educational Objectives (PEOs)**

- **PEO1:** Graduates in Civil Engineering will apply the technical knowledge for sustainable societal growth.
- **PEO2:** Graduates of civil Engineering will demonstrate designing, modeling and analyzing skills.
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### **Program Outcomes (POs)**

- **PO-1:** Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and Civil Engineering principles to the solution of complex problems in Civil Engineering.
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- **PO-10:** Communication: Communicate effectively on complex Civil Engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective

presentations, and give and receive clear instructions.

- **PO-11:** Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage Civil Engineering projects and in multidisciplinary environments.
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### **Program Specific Outcome (PSO)**

- **PSO-1:** Apply the knowledge of Civil Engineering in Sustainable Infrastructure developments.
- **PSO-2:** Identify, analyze and manage Civil Engineering problems with ethical and social responsibilities.
- **PSO-3:** Implementation of relevant codes/ specifications/ guidelines to arrive at comprehensive solutions to address societal needs and exhibit communication and teamwork skills.



***DEPARTMENT OF CIVIL ENGINEERING***

**III & IV Semesters**

***Scheme and Syllabus***

***with effect from Academic Year***

***2017 - 18***

### Third Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16CVM31	Engineering Mathematics-III (IC)	Mathematics	3-0-2-0	4	100
2	16CVT32	Building Materials and Concrete Technology	CE	3-0-0-0	3	100
3	16CVT33	Strength of Materials	CE	3-0-0-0	3	100
4	16CVT34	Surveying	CE	4-0-0-0	4	100
5	16CVI35	Engineering Geology (IC)	CE	3-0-2-0	4	100
6	16CVT36X	Foundation Elective-I	CE	3-0-0-0	3	100
7	16CVL37	Basic Material Testing Laboratory	CE	1-0-2-0	2	100
8	16CVL38	Surveying Practice-I	CE	1-0-2-0	2	100
9	16CVH39	Soft Skills Development	CE	0-2-0-0	1	100
<b>Total</b>				<b>21-2-8-0</b>	<b>26</b>	<b>900</b>

### Foundation Elective-I

Sl. No.	Course Code	Course
1	16CVT361	Ecology and Environmental Impact Assessment
2	16CVT362	Rural Water Supply and Sanitation
3	16CVT363	Solid Waste Management

### Fourth Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16CVM41	Engineering Mathematics-IV (IC)	Mathematics	3-0-2-0	4	100
2	16CVT42	Fluid Mechanics	CE	4-0-0-0	4	100
3	16CVT43	Structural Analysis-I	CE	3-0-0-0	3	100
4	16CVI44	Building Planning and Drawing (IC)	CE	3-0-2-0	4	100
5	16CVT45X	Foundation Elective-II	CE	3-0-0-0	3	100
6	16CVT46X	Engineering Elective-III	CE	3-0-0-0	3	100
7	16CVL47	Concrete Laboratory	CE	1-0-2-0	2	100
8	16CVL48	Surveying Practice-II	CE	1-0-2-0	2	100
9	16CVH49	Soft Skills Development	CE	0-2-0-0	1	100
<b>Total</b>				<b>21-2-8-0</b>	<b>26</b>	<b>900</b>

## Foundation Elective-II

Sl. No.	Course Code	Course
1	16CVT451	Elements of Construction Industry
2	16CVT452	Alternative Building Material And Technology
3	16CVT453	Advanced Concrete Technology
4	16CVT454	Online Certification Course, IIRS- ISRO certification. Equivalent to 36-40 hours approved by Department

## Engineering Elective-III

Sl. No.	Course Code	Course
1	16CVT461	Renewable Energy Resources
2	16CVT462	Environmental Air Pollution
3	16CVT463	Remote Sensing and GIS
4	16CVT464	Smart Materials

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study

# **V to VIII Semesters**

## ***Scheme and Syllabus***

***With effect from Academic Year 2018-19***

## Fifth Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16CVI51	Transportation Engineering (IC)	CV	3:0:2:0	4	100
2	16CVT52	Structural Analysis-II	CV	3:0:0:0	3	100
3	16CVI53	Design of RCC Structural Elements (IC)	CV	3:0:2:0	4	100
4	16CVT54X	Foundation Elective-IV	CV	3:0:0:0	3	100
5	16CVT55X	Foundation Elective-V	CV	3:0:0:0	3	100
6	16CVT56X	Engineering Elective-VI / PBL	CV	3:0:0:0	3	100
7	16CVL57	Fluid Mechanics Lab	CV	1:0:2:0	2	100
8	16CVL58	Analysis and Design Lab-I	CV	1:0:2:0	2	100
9	16CVH59	General Aptitude	CV/BS&H	2:0:0:0	2	100
<b>Total</b>				<b>22:0:8:0</b>	<b>26</b>	<b>900</b>

### Foundation Elective – IV

Sl. No.	Course Code	Course
1	16CVT541	Construction Industry Practice-I
2	16CVT542	Advanced Fluid Mechanics
3	16CVT543	Traffic Engineering

### Foundation Elective – V

Sl. No.	Course Code	Course
1	16CVT551	Advanced Surveying
2	16CVT552	Construction Management and Engineering Economics
3	16CVT553	Online Certification courses from IITs / IISc / SWAYAM / EDX

### Engineering Elective – VI / PBL

Sl. No.	Course Code	Course
1	16CVT561	Green Buildings
2	16CVT562	Building Services
3	16CVT563	Hydrology and Irrigation Engineering

## Sixth Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16CVI61	Design of Steel Structures (IC)	CV	3:0:2:0	4	100
2	16CVT62	Geotechnical Engineering-I	CV	3:0:0:0	3	100
3	16CVI63	Environmental Engineering (IC)	CV	3:0:2:0	4	100
4	16CVT64X	Foundation Elective-VII	CV	3:0:0:0	3	100
5	16CVT65X	Engineering Elective-VIII / PBL	CV	3:0:0:0	3	100
6	16HOE66X	Open Elective-IX	CV/BS&H	2:0:0:4	3	100
7	16CVL67	Detailing of Structural Elements Lab	CV	1:0:2:0	2	100
8	16CVL68	Extensive Survey Camp	CV	1:0:2:0	2	100
9	16CVH69	Technical Aptitude and GD	CV/BS&H	2:0:0:0	2	100
<b>Total</b>				<b>21:0:8:4</b>	<b>26</b>	<b>900</b>

### Foundation Elective – VII

Sl. No.	Course Code	Course
1	16CVT641	Construction Industry Practice-II
2	16CVT642	Advanced Transportation Engineering
3	16CVT643	Earthquake Resistant Design of Structures

### Engineering Elective – VIII / PBL

Sl. No.	Course Code	Course
1	16CVT651	Pollution Control and Management
2	16CVT652	Water Resources Engineering
3	16CVT653	Pavement Materials and Construction

### Open Elective – IX

Sl. No.	Course Code	Course
1	16HOE661	Lab View – Level 1
2	16HOE662	Yoga and Meditation
3	16HOE663	Martial Arts
4	16HOE664	Music (Carnatic Vocal / Instrumental)
5	16HOE665	Dance
6	16HOE666	Sports
7	16HOE667	Online Certification Courses from IITs / IISc / SWAYAM / EDX

## Seventh Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16CVT71	Geotechnical Engineering-II (IC)	CV	3:0:2:0	4	100
2	16CVT72	Estimation and Valuation (IC)	CV	3:0:2:0	4	100
3	16CVT73X	Foundation Elective-X	CV	3:0:0:0	3	100
4	16CVT74X	Engineering Elective-XI / PBL	CV	3:0:0:0	3	100
5	16HOE75X	Open Elective-XII	CV/BS&H/ME	2:0:0:4	3	100
6	16HOE76X	Open Elective-XIII	CV/BS&H	2:0:0:4	3	100
7	16CVL77	Project Management Lab	CV	0-0-2-0	1	100
8	16CVL78	Analysis and Design Lab-II	CV	1:0:2:0	2	100
9	16CVP79	Project Phase-I	CV	1-0-4-0	3	100
<b>Total</b>				<b>18-0-12-8</b>	<b>26</b>	<b>900</b>

### Foundation Elective – X

Sl. No.	Course Code	Course
1	16CVT731	Construction Industry Practice-III
2	16CVT732	Pre-Stressed Concrete Structures
3	16CVT733	Pavement Design

### Engineering Elective – XI / PBL

Sl. No.	Course Code	Course
1	16CVT741	Fire safety and management
2	16CVT742	Fundamentals of Energy, Environment and climate change
3	16CVT743	Industrial Waste Water treatment

## Open Elective – XII

Sl. No.	Course Code	Course
1	16HOE751	Tax Management
2	16HOE752	Assessment of Building Energy Performance (Offered by ASHRAE)
3	16HOE753	Natural Disaster Mitigation and Management
4	16HOE754	Online Certification courses from IITs / IISc / SWAYAM / EDX

## Open Elective – XIII

Sl. No.	Course Code	Course
1	16HOE761	Small and Medium Enterprise Management
2	16HOE762	Occupational Safety and Health Administration
3	16HOE763	Animation and Multimedia Engineering
4	16HOE764	Online Certification courses from IITs / IISc / SWAYAM / EDX

## Eighth Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	Total Credits	Marks
1	16CVP81	Project Phase-II	CV	4	100
2	16CVP82	Project Phase-III	CV	4	100
3	16CVP83	Evaluation and Viva voce (External)	CV	10	100
		<b>Total</b>		<b>18</b>	<b>300</b>

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study





***Choice Based Credit System CBCS***

***Outcome Based Education Curriculum***

**2017-2017**

Department of Civil Engineering  
**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
Mudugurki Village, VenkatagiriKote Post, Devanahalli taluk,  
Bangalore district - 562 164



*An Autonomous College under VTU*

## **DEPARTMENT OF CIVIL ENGINEERING**

### **VISION**

To transform the students as leaders in Civil Engineering to achieve professional excellence in the challenging future.

### **MISSION**

**M1:** To provide the Civil Engineering knowledge and skills for students through an excellent academic environment.

**M2:** Adopting innovative teaching techniques using modern engineering tools for designing, modeling and analyzing the societal and environmental problems.

**M3:** Developing Communication skill, leadership qualities through teamwork and skills for continuing education among the students.

**M4:** To inculcate moral, ethical and professional values among students to serve the society.

**M5:** Validate engineering knowledge through innovative research projects to enhance their employability and entrepreneurship skills.

### **Program Educational Objectives (PEOs)**

- **PEO1:** Graduates in Civil Engineering will apply the technical knowledge for sustainable societal growth.
- **PEO2:** Graduates of civil Engineering will demonstrate designing, modeling and analyzing skills.
- **PEO3:** Graduates in Civil Engineering will demonstrate good communication skills, dynamic leadership qualities with concern for environmental protection.
- **PEO4:** Civil Engineering graduates will be capable of pursuing higher studies, take up research and development work blended with ethics and human values.
- **PEO5:** Civil engineering graduates will have the ability to become entrepreneurs thereby switching over from responsive engineering to creative engineering.

### **Program Outcomes (POs)**

- **PO-1:** Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and Civil

Engineering principles to the solution of complex problems in Civil Engineering.

- **PO-2:** Problem Analysis: Identify, formulate, research literature and analyze complex Civil Engineering problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.
- **PO-3:** Design/Development of Solutions: Design solutions for complex Civil Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.
- **PO-4:** Conduct Investigations of Complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions related to Civil Engineering problems.
- **PO-5:** Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering tools such as CAD, FEM, GIS, etc. including prediction and modeling to complex Civil Engineering activities with an understanding of the limitations.

- **PO-6:** The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Civil Engineering practice.
- **PO-7:** Environment and Sustainability: Understand the impact of the professional Civil Engineering solutions in societal and environmental contexts and demonstrate the knowledge and the need for sustainable development.
- **PO-8:** Ethics: Apply ethical principles and commit to professional ethics and responsibilities while following the Civil Engineering practice.
- **PO-9:** Individual and Team work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.
- **PO-10:** Communication: Communicate effectively on complex Civil Engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

- **PO-11:** Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage Civil Engineering projects and in multidisciplinary environments.
- **PO-12:** Life Long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### **Program Specific Outcome (PSO)**

- **PSO-1:** Apply the knowledge of Civil Engineering in Sustainable Infrastructure developments.
- **PSO-2:** Identify, analyze and manage Civil Engineering problems with ethical and social responsibilities.
- **PSO-3:** Implementation of relevant codes/ specifications/ guidelines to arrive at comprehensive solutions to address societal needs and exhibit communication and teamwork skills.

***DEPARTMENT OF CIVIL ENGINEERING***

***III & IV Semesters***

***Scheme and Syllabus***

***With effect from Academic Year***

***2015 -16***

**Third Semester B.E. - Scheme**

Sl. No	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	15CVM31	Engineering Mathematics-III (IC)	Mathematics	3-0-2-0	4	100
2	15CVT32	Building Materials and Concrete Technology	CE	3-0-0-0	3	100
3	15CVT33	Strength of Materials	CE	3-0-0-0	3	100
4	15CVT34	Surveying	CE	4-0-0-0	4	100
5	15CVI35	Engineering Geology (IC)	CE	3-0-2-0	4	100
6	15CVT36X	Foundation Elective-I	CE	3-0-0-0	3	100
7	15CVL37	Basic Material Testing Laboratory	CE	1-0-2-0	2	100
8	15CVL38	Surveying Practice-I	CE	1-0-2-0	2	100
9	15CVH39	Soft Skills Development	CE	0-2-0-0	1	100
Total				21-2-8-0	26	900

**Foundation Elective-I**

Sl. No	Course Code	Course
1	15CVT361	Ecology and Environmental Impact Assessment
2	15CVT362	Rural Water Supply and Sanitation
3	15CVT363	Solid Waste Management

**Fourth Semester B.E. - Scheme**

Sl. No	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	15CVM41	Engineering Mathematics-IV (IC)	Mathematics	3-0-2-0	4	100
2	15CVT42	Fluid Mechanics	CE	4-0-0-0	4	100
3	15CVT43	Structural Analysis-I	CE	3-0-0-0	3	100
4	15CVI44	Building Planning and Drawing (IC)	CE	3-0-2-0	4	100
5	15CVT45X	Foundation Elective-II	CE	3-0-0-0	3	100
6	15CVT46X	Engineering Elective-III	CE	3-0-0-0	3	100
7	15CVL47	Concrete Laboratory	CE	1-0-2-0	2	100
8	15CVL48	Surveying Practice-II	CE	1-0-2-0	2	100
9	15CVH49	Soft Skills Development	CE	0-2-0-0	1	100
Total				21-2-8-0	26	900



## Foundation Elective-II

Sl. No	Course Code	Course
1	15CVT451	Air Pollution and Control
2	15CVT452	Remote Sensing and GIS
3	15CVT453	Alternative Building Materials
4	15CVT454	Advanced Concrete Technology

## Engineering Elective-III

Sl. No	Course Code	Course
1	15CVT461	Renewable Energy Resources
2	15CVT462	Object Oriented Programming with C++
3	15CVT463	Management Information Systems
4	15CVT464	Smart Materials

**IC – Integrated Course**

**L – Lecture**

**T-Tutorials**

**P-Practical**

**S – Self Study**

**V to VIII Semesters**  
***Scheme and Syllabus***  
***With effect from Academic Year 2017 -18***

## Fifth Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	15CVI51	Transportation Engineering (IC)	CV	3-0-2-0	4	100
2	15CVT52	Structural Analysis-II	CV	3-0-0-0	3	100
3	15CVI53	Design of RCC Structural Elements (IC)	CV	3-0-2-0	4	100
4	15CVT54X	Foundation Elective-IV	CV	3-0-0-0	3	100
5	15CVT55X	Foundation Elective-V	CV	3-0-0-0	3	100
6	15CVT56X	Engineering Elective-VI / PBL	CV	3-0-0-0	3	100
7	15CVL57	Fluid Mechanics Lab	CV	1-0-2-0	2	100
8	15CVL58	Analysis and Design Lab-I	CV	1-0-2-0	2	100
9	15CVH59	General Aptitude	CV/BS&H	2-0-0-0	2	100
Total				22-0-8-0	26	900

### Foundation Elective – IV

Sl. No.	Course Code	Course
1	15CVT541	Construction Industry Practice-I
2	15CVT542	Advanced Fluid Mechanics
3	15CVT543	Traffic Engineering

### Foundation Elective – V

Sl. No.	Course Code	Course
1	15CVT551	Advanced Surveying
2	15CVT552	Construction Management and Engineering Economics
3	15CVT553	Online Certification courses from IITs / IISc / SWAYAM / EDX

### Engineering Elective – VI / PBL

Sl. No.	Course Code	Course
1	15CVT561	Green Buildings
2	15CVT562	Building Services
3	15CVT563	Hydrology and Irrigation Engineering

## Sixth Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	15CVI61	Design of Steel Structures (IC)	CV	3-0-2-0	4	100
2	15CVT62	Geotechnical Engineering-I	CV	3-0-0-0	3	100
3	15CVI63	Environmental Engineering (IC)	CV	3-0-2-0	4	100
4	15CVT64X	Foundation Elective-VII	CV	3-0-0-0	3	100
5	15CVT65X	Engineering Elective-VIII / PBL	CV	3-0-0-0	3	100
6	15HOE66X	Open Elective-IX	CV/BS&H	2-0-0-4	3	100
7	15CVL67	Detailing of Structural Elements Lab	CV	1-0-2-0	2	100
8	15CVL68	Extensive Survey Camp	CV	1-0-2-0	2	100
9	15CVH69	Technical Aptitude and GD	CV/BS&H	2-0-0-0	2	100
<b>Total</b>				<b>21-0-8-4</b>	<b>26</b>	<b>900</b>

### Foundation Elective – VII

Sl. No.	Course Code	Course
1	15CVT641	Construction Industry Practice-II
2	15CVT642	Advanced Transportation Engineering
3	15CVT643	Earthquake Resistant Design of Structures

### Engineering Elective – VIII / PBL

Sl. No.	Course Code	Course
1	15CVT651	Pollution Control and Management
2	15CVT652	Water Resources Engineering
3	15CVT653	Pavement Materials and Construction

### Open Elective – IX

Sl. No.	Course Code	Course
1	15HOE661	Lab View – Level 1
2	15HOE662	Yoga and Meditation
3	15HOE663	Martial Arts
4	15HOE664	Music (Carnatic Vocal / Instrumental)
5	15HOE665	Dance
6	15HOE666	Sports
7	15HOE667	Online Certification Courses from IITs / IISc / SWAYAM / EDX

**Seventh Semester B.E. – Scheme**

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	15CVT71	Geotechnical Engineering-II (IC)	CV	3-0-2-0	4	100
2	15CVT72	Estimation and Valuation (IC)	CV	3-0-2-0	4	100
3	15CVT73X	Foundation Elective-X	CV	3-0-0-0	3	100
4	15CVT74X	Engineering Elective-XI / PBL	CV	3-0-0-0	3	100
5	15HOE75X	Open Elective-XII	CV/BS&H/ME	2-0-0-4	3	100
6	15HOE76X	Open Elective-XIII	CV/BS&H	2-0-0-4	3	100
7	15CVL77	Project Management Lab	CV	0-0-2-0	1	100
8	15CVL78	Analysis and Design Lab-II	CV	1-0-2-0	2	100
9	15CVP79	Project Phase-I	CV	1-0-4-0	3	100
<b>Total</b>				<b>18-0-12-8</b>	<b>26</b>	<b>900</b>

**Foundation Elective – X**

Sl. No.	Course Code	Course
1	15CVT731	Construction Industry Practice-III
2	15CVT732	Pre-Stressed Concrete Structures
3	15CVT733	Pavement Design

**Engineering Elective – XI / PBL**

Sl. No.	Course Code	Course
1	15CVT741	Fire safety and management
2	15CVT742	Fundamentals of Energy, Environment and climate change
3	15CVT743	Industrial Waste Water treatment

## Open Elective – XII

Sl. No.	Course Code	Course
1	15HOE751	Tax Management
2	15HOE752	Assessment of Building Energy Performance (Offered by ASHRAE)
3	15HOE753	Natural Disaster Mitigation and Management
4	15HOE754	Online Certification courses from IITs / IISc / SWAYAM / EDX

## Open Elective – XIII

Sl. No.	Course Code	Course
1	15HOE761	Small and Medium Enterprise Management
2	15HOE762	Occupational Safety and Health Administration
3	15HOE763	Animation and Multimedia Engineering
4	15HOE764	Online Certification courses from IITs / IISc / SWAYAM / EDX

## Eighth Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	Total Credits	Marks
1	15CVP81	Project Phase-II	CV	4	100
2	15CVP82	Project Phase-III	CV	4	100
3	15CVP83	Evaluation and Viva voce (External)	CV	10	100
		<b>Total</b>		<b>18</b>	<b>300</b>

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study



**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System CBCS**

***Outcome Based Education Curriculum***

***2020-2021***

Department of Electronics & Communication Engineering

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, Venkatagirikote Post, Devanahalli taluk,  
Bangalore district - 562 164



**An Autonomous College under VTU**

## **DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

### **VISION**

To transform the students as leaders in Electronics & Communication Engineering to achieve professional excellence in the challenging future

### **MISSION**

- M1: To create an environment for the students to have strong academic fundamentals and enable them to be life-long learners.
- M2: To provide modern tools to the students in the field of electronics and communication to meet the real-world challenges.
- M3: To develop Communication skill, leadership qualities, team work and skills for continuing education among the students.
- M4: To inculcate Ethics, Human values and skills for solving societal problems and environmental protection.
- M5: Validate engineering knowledge through innovative research projects to enhance their employability and entrepreneurship skills.

### **III to VIII Semesters Scheme and Syllabus With effect from Academic Year 2020-21**



## **Program Educational Objectives (PEOs)**

**PEO-1:** Graduates of Electronics and Communication engineering will be using the basic academic knowledge of design and analysis required in the industry for sustainable societal growth.

**PEO-2:** Graduates of Electronics and Communication engineering will be able to design project based learning and team based learning.

**PEO-3:** Graduates in Electronics and Communication engineering will demonstrate good communication skills, dynamic leadership qualities with concern for environmental protection.

**PEO-4:** Electronics and Communication engineering graduates will be capable of pursuing higher studies, take up research and development work blended with ethics and human values.

**PEO-5:** Electronics and Communication engineering graduates will have the ability to get employed and become entrepreneurs thereby switching over from responsive engineering to creative engineering.

## **Program Outcomes and Program Specific Outcomes as defined by the Program**

### **Program Outcome:**

**PO1:** Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and electronics and communication engineering principles to the solution of complex problems in electronics and communication engineering.

**PO2:** Problem Analysis: Identify, formulate, research literature, and analyze complex electronics and communication engineering problems reaching substantiated conclusions using first principles of mathematics, and engineering sciences.

**PO3:** Design/Development of Solutions: Design solutions for complex electronics and communication engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4:** Conduct Investigations of Complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions related to electronics and communication engineering problems.

**PO5:** Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex electronics and communication engineering activities with an understanding of the limitations.

**PO6:** The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities

relevant to the professional electronics and communication engineering practice.

**PO7: Environment and Sustainability:** Understand the impact of the professional electronics and communication engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the electronics and communication engineering practice.

**PO9: Individual and Teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10: Communication:** Communicate effectively on complex electronics and communication engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11: Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12: Life Long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### **Program Specific Outcome (PSO):**

**PSO1.** Graduate will be able to identify, analyze & solve the problems related to Electronics and Communication Engineering by applying the fundamental knowledge of Electronics and Communication.

**PSO2.** Graduate will demonstrate an ability to investigate, design and develop both software and hardware using significant knowledge of modern tools in Electronics and Communication Engineering.

**PSO3.** Graduate will be able to apply their knowledge to assess societal, environmental, health, safety issues with professional ethics and can also pursue higher studies, involve in research activities, be employable or entrepreneur.

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGG**

**Third Semester B.E.-Scheme**

Sl. No	Course Code	Course	Teaching Dept	L-T-P (Hrs/week)	Total Credits	Marks
1	19MAT31	Fourier series, Transforms and Numerical Techniques	Mathematics	3-2-0	4	100
2	19ECT32	Analog Electronic Circuits	EC	3-0-0	3	100
3	19ECI33	Digital Electronic Circuits(IC)	EC	3-0-2	4	100
4	19ECT34	Network Analysis	EC	2-2-0	3	100
5	19ECT35	Data Structure using C	CS/IS	3-0-0	3	100
6	19ECT36	Electronic Instrumentation	EC	3-0-0	3	100
7	19ECL37	Analog Electronics Circuits Lab	EC	1-0-2	2	100
8	19CPH38	Constitution of India and Professional Ethics and Human Rights	S&H	1-0-0	1	100
9	19ECH39	Elements of Communication	PT	0-0-4	2	100
<b>TOTAL</b>				<b>19-4-8</b>	<b>25</b>	<b>900</b>

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGG**

**Fourth Semester B.E.-Scheme**

Sl. No	Course Code	Course	Teaching Dept	L-T-P (Hrs/week)	Total Credits	Marks
1	19MAT41	Applied Calculus and Probability Distribution	Mathematics	3-2-0	4	100
2	19ECT42	Microprocessors and Microcontrollers	EC	3-0-0	3	100
3	19ECI43	Fundamentals of HDL (IC)	EC	3-0-2	4	100
4	19ECT44	Signals and Systems	EC	2-2-0	3	100
5	19ECT45	Engineering Electromagnetics	EC	2-2-0	3	100
6	19ECL46	Microprocessors and Microcontrollers LAB	EC	1-0-2	2	100
7	<b>19UHV47</b>	Universal Human Values	S&H	3-0-0	3	100
8	19KVK48/ 19KAK48	Vyavaharika/Adalitha Kannada	S&H	1-0-0	1	100
9	19ECH49	Professional Development of Engineers	PT	0-0-4	2	100
<b>TOTAL</b>				<b>18-6-8</b>	<b>25</b>	<b>900</b>

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGG**

**Fifth Semester B.E.-Scheme**

Sl. No	Course Code	Course	Teaching Dept	L-T-P (Hrs/week)	Total Credits	Marks
1	18ECT51	Analog Communication	EC	3-2-0	4	100
2	18ECI52	Fundamentals of CMOS VLSI (IC)	EC	3-0-2	4	100
3	18ECT53	Information Theory and Coding	EC	2-2-0	3	100
4	18ECT54	Accountancy and Taxation	ECH	3-0-0	3	100
5	18ECT55X	Professional Elective-I	EC	3-0-0	3	100
6	18ECT56X	Professional Elective-II	CS/IS	3-0-0	3	100
7	18ECL57	Analog Communication LAB	EC	1-0-2	2	100
8	18ECH58	Environmental Studies	S&H	1-0-0	1	100
9	18ECH59	Employability Skills and Aptitude Development	PD	0-0-4	2	100
<b>TOTAL</b>				<b>19-4-8</b>	<b>25</b>	<b>900</b>

**Professional Elective-I**

Sl.No	Course Code	Course
1	18ECT551	Digital Switching Systems
2	18ECT552	Linear Integrated Circuits
3	18ECT553	Control Systems

**Professional Elective-II**

Sl.No	Course Code	Course
1	18ECT561	Object Oriented Programming using C++
2	18ECT562	Web Technology
3	18ECT563	JAVA Programming

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGG**

**Sixth Semester B.E.-Scheme**

Sl. No	Course Code	Course	Teaching Dept	L-T-P (Hrs/week)	Total Credits	Marks
1	18ECT61	Digital Communication	EC	3-0-0	3	100
2	18ECT62	Digital Signal Processing	EC	2-2-0	3	100
3	18ECT63	Antennas and Wave Propagation	EC	3-0-0	3	100
4	18ECT64X	Professional Elective-III	EC	3-0-0	3	100
5	18ECT65X	Professional Elective-IV	EC	3-0-0	3	100
6	18HOE66X	Industrial Elective-I	EC	3-0-0	3	100
7	18ECL67	Digital Communication LAB	EC	1-0-2	2	100
8	18ECL68	Digital Signal Processing LAB	EC	1-0-2	2	100
9	18ECH69	Employability Skills and Aptitude Development	PD	1-0-4	3	100
<b>TOTAL</b>				20-2-8	25	900

**Professional Elective-III**

Sl.No	Course Code	Course
1	18ECT641	ARM Processors
2	18ECT642	Internet Of Things Technology
3	18ECT643	Nano-electronics

**Professional Elective-IV**

Sl.No	Course Code	Course
1	18ECT651	Artificial Neural Networks
2	18ECT652	Image Processing
3	18ECT653	Pattern Recognition

**Industrial Elective-I**

<b>Sl.No</b>	<b>Course Code</b>	<b>Course</b>
1	18HOE661	LabVIEW – Level 1
2	18HOE662	Robotic Process Automation
3	18HOE663	Wireless and Mobile Communication

## Seventh Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17ECT71	Power Electronics	EC	3-0-0-0	3	100
2	17ECT72	Data Communication	EC	3-0-0-0	3	100
3	17ECI73X	Foundation Elective-X (IC)	EC	3-0-2-0	4	100
4	17ECT74X	Engineering Elective-XI	EC/ME/CS	3-0-0-0	3	100
5	17HOE75X	Open Elective-XII	EC/BS&H	2-0-0-4	3	100
6	17HOE76X	Open Elective-XIII	EC/BS&H	2-0-0-4	3	100
7	17ECL77	Power Electronics Lab	EC	1-0-2-0	2	100
8	17ECL78	Data Communication Lab	EC	1-0-2-0	2	100
9	17ECP79	Project Phase-I and Seminar	EC	0-0-6-0	3	100
<b>Total</b>				<b>18-0-12-8</b>	<b>26</b>	<b>900</b>

### Foundation Elective-X (IC)

Sl. No.	Course Code	Course
1	17ECI731	Optical Fiber Communication
2	17ECI732	Web Technology
3	17ECI733	Online Certification courses from IITs / IISc / SWAYAM / EDX

### Engineering Elective-XI / PBL

Sl. No.	Course Code	Course
1	17ECT741	Wireless Communication
2	17ECT742	Artificial Intelligence
3	17ECT743	MEMS



## Open Elective-XII

Sl. No.	Course Code	Course
1	17HOE751	Tax Management
2	17HOE752	Assessment of Building Energy Performance (Offered by ASHRAE)
3	17HOE753	Crisis Management
4	17HOE754	Online certification courses from IITs / IISC / SWAYAM / EDX

## Open Elective-XIII

Sl. No.	Course Code	Course
1	17HOE761	Small & Medium Enterprise Management
2	17HOE762	Occupational Safety & Health Administration
3	17HOE763	Animation & Multimedia Engineering
4	17HOE774	Online certification courses from IITs / IISC / SWAYAM / EDX

## Eighth Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	Total Credits	Marks
1	17ECP81	Project Phase-II and Seminar	EC	4	100
2	17ECP82	Project Phase-III and Seminar	EC	4	100
3	17ECP83	Evaluation and Viva voce (External)	EC	10	100
<b>Total</b>				<b>18</b>	<b>300</b>

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study



**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System CBCS**

***Outcome Based Education Curriculum***

**2019-2020**

Department of Electronics & Communication Engineering

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, VenkatagiriKote Post, Devanahalli taluk,  
Bangalore district - 562 164



**An Autonomous College under VTU**

## **DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

### **VISION**

To transform the students as leaders in Electronics & Communication Engineering to achieve professional excellence in the challenging future

### **MISSION**

- M1: To create an environment for the students to have strong academic fundamentals and enable them to be life-long learners.
- M2: To provide modern tools to the students in the field of electronics and communication to meet the real-world challenges.
- M3: To develop Communication skill, leadership qualities, team work and skills for continuing education among the students.
- M4: To inculcate Ethics, Human values and skills for solving societal problems and environmental protection.
- M5: Validate engineering knowledge through innovative research projects to enhance their employability and entrepreneurship skills.

### **III to VIII Semesters Scheme and Syllabus With effect from Academic Year 2019-20**

## **Program Educational Objectives (PEOs)**

**PEO-1:** Graduates of Electronics and Communication engineering will be using the basic academic knowledge of design and analysis required in the industry for sustainable societal growth.

**PEO-2:** Graduates of Electronics and Communication engineering will be able to design project based learning and team based learning.

**PEO-3:** Graduates in Electronics and Communication engineering will demonstrate good communication skills, dynamic leadership qualities with concern for environmental protection.

**PEO-4:** Electronics and Communication engineering graduates will be capable of pursuing higher studies, take up research and development work blended with ethics and human values.

**PEO-5:** Electronics and Communication engineering graduates will have the ability to get employed and become entrepreneurs thereby switching over from responsive engineering to creative engineering.

## **Program Outcomes and Program Specific Outcomes as defined by the Program**

### **Program Outcome:**

**PO1:** Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and electronics and communication engineering principles to the solution of complex problems in electronics and communication engineering.

**PO2:** Problem Analysis: Identify, formulate, research literature, and analyze complex electronics and communication engineering problems reaching substantiated conclusions using first principles of mathematics, and engineering sciences.

**PO3:** Design/Development of Solutions: Design solutions for complex electronics and communication engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4:** Conduct Investigations of Complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions related to electronics and communication engineering problems.

**PO5:** Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex electronics and communication engineering activities with an understanding of the limitations.

**PO6:** The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities

relevant to the professional electronics and communication engineering practice.

**PO7: Environment and Sustainability:** Understand the impact of the professional electronics and communication engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the electronics and communication engineering practice.

**PO9: Individual and Teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10: Communication:** Communicate effectively on complex electronics and communication engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11: Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12: Life Long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### **Program Specific Outcome (PSO):**

**PSO1.** Graduate will be able to identify, analyze & solve the problems related to Electronics and Communication Engineering by applying the fundamental knowledge of Electronics and Communication.

**PSO2.** Graduate will demonstrate an ability to investigate, design and develop both software and hardware using significant knowledge of modern tools in Electronics and Communication Engineering.

**PSO3.** Graduate will be able to apply their knowledge to assess societal, environmental, health, safety issues with professional ethics and can also pursue higher studies, involve in research activities, be employable or entrepreneur.

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGG**

**Third Semester B.E.-Scheme**

Sl. No.	Course Code	Course	Teaching Dept.	L:T:P:S (Hrs/week)	Total Credits	Marks
1	18ECM31	Integral Transforms with SCILAB (IC)	Maths	3:0:2:0	4	100
2	18ECT32	Analog Electronic Circuits	EC	4:0:0:0	4	100
3	18ECI33	Digital Electronic Circuits(IC)	EC	3:0:2:0	4	100
4	18ECI34	Network Analysis (IC)	EC	3:0:2:0	4	100
5	18ECT35X	Foundation Elective – I	EC	4:0:0:0	4	100
6	18ECL36	Analog Electronic Circuits Laboratory	EC	1:0:2:0	2	100
7	18CSD37	Career Skill Development Programme	S&H	1:2:0:0	2	100
8	18CPH38	Constitution of India and Professional Ethics and Human Rights	S&H	1:0:0:0	1	100
<b>TOTAL</b>				<b>20-2-8-0</b>	<b>25</b>	<b>800</b>

**Foundation Elective – I (IC)**

Sl. No.	Course Code	Course
1	18ECT351	Engineering Electromagnetics
2	18ECT352	Data Structures with C
3	18ECT353	Electronic Devices

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGG**

**Fourth Semester B.E.-Scheme**

Sl. No.	Course Code	Course	Teaching Dept	L:T:P:S (Hrs/week)	Total Credits	Marks
1	18ECM41	Fourier Series and Probability Theory (IC)	Maths	3:0:2:0	4	100
2	18ECT42	Fundamentals of HDL	EC	4:0:0:0	4	100
3	18ECI43	Signals and Systems (IC)	EC	3:0:2:0	4	100
4	18ECI44X	Foundation Elective – II (IC)	EC	3:0:2:0	4	100
5	18EET45X	Engineering Elective – III	EC	4:0:0:0	4	100
6	18ECL46	Fundamentals of HDL Lab	EC	1:0:2:0	2	100
7	18CSD47	Technical Report Writing & IRDP	S&H	1:2:0:0	2	100
8	18KAK38 / 18KAK38	Vyavaharika Kannada / Adalitha Kannada	S&H	1:0:0:0	1	100
<b>TOTAL</b>				<b>20-2-8-0</b>	<b>25</b>	<b>800</b>

**Foundation Elective - II (IC)**

SI. No.	Course Code	Course
1	18ECI441	Linear Integrated Circuits & Applications
2	18ECI442	Transmission Lines and Wave Guides (TLWG)
3	18ECI443	Electronic Instrumentation

**Engineering Elective - III**

SI. No.	Course Code	Course
1	18EET451	Renewable Energy Resources
2	18EET452	Introduction to Cyber Security and Cyber Laws
3	18EET453	Management Information System
4	18EET454	Environmental Air Pollution

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGG**

**Fifth Semester B.E.-Scheme**

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17ECT51	Communication Systems	EC	3-0-0-0	3	100
2	17ECT52	Microcontrollers	EC	3-0-0-0	3	100
3	17ECT53	Information Theory and Coding	EC	3-0-0-0	3	100
4	17ECI54X	Foundation Elective-IV (IC)	EC	3-0-2-0	4	100
5	17ECI55X	Foundation Elective-V (IC)	EC	3-0-2-0	4	100
6	17ECT56X	Engineering Elective-VI / PBL	EC/ME	3-0-0-0	3	100
7	17ECL57	Microcontroller Lab	EC	1-0-2-0	2	100
8	17ECL58	Communication System Lab	EC	1-0-2-0	2	100
9	17ECH59	General Aptitude	EC/BS&H	2-0-0-0	2	100
<b>Total</b>				<b>22-0-8-0</b>	<b>26</b>	<b>900</b>

**Foundation Elective-IV (IC)**

SI. No.	Course Code	Course
1	17ECI541	Control Systems
2	17ECI542	Low power VLSI Design
3	17ECI543	Microwave & Radar

**Foundation Elective-V (IC)**

SI. No.	Course Code	Course
1	17ECI551	Digital System Design using Verilog
2	17ECI552	Object Oriented Programming with JAVA
3	17ECI553	Online Certification course from IITs / IISc / SWAYAM / EDX

**Engineering Elective-VI / PBL**

SI. No.	Course Code	Course
1	17ECT561	Mechatronics
2	17ECT562	Energy Engineering and Management
3	17ECT563	Linear Algebra
4	17ECT564	Management Information Systems



**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGG**

**Sixth Semester B.E.-Scheme**

Sl. No	Course Code	Course	TeachingDept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17ECT61	Digital Signal Processing	EC	4-0-0-0	4	100
2	17ECT62	Digital Communication	EC	4-0-0-0	4	100
3	17ECI63X	Foundation Elective-VII (IC)	EC	3-0-2-0	4	100
4	17ECT64X	Engineering Elective-VIII/PBL	EC	3-0-0-0	3	100
5	17ECL65	Digital Signal Processing Lab	EC	1-0-2-0	2	100
6	17HOE66X	Open Elective-IX	EC/BS&H	2-0-0-4	3	100
7	17ECL67	Digital Communication Lab	EC	1-0-2-0	2	100
8	17ECH68	Technical aptitude and GD	EC/BS&H	2-0-0-0	2	100
9	17ECP69	Mini Project and Seminar	EC	0-0-4-0	2	100
<b>Total</b>				<b>20-0-10-4</b>	<b>26</b>	<b>900</b>

**Foundation Elective-VII (IC)**

Sl. No.	Course Code	Course
1	17ECI631	Antenna and Propagation
2	17ECI632	Database Concepts
3	17ECI633	Online certification courses from IITs / IISC / SWAYAM / EDX

**Engineering Elective-VIII / PBL**

Sl. No.	Course Code	Course
1	17ECT641	Operations Research
2	17ECT642	Robotics
3	17ECT643	Internet of Things (IoT)

**Open Elective-VIII**

Sl. No.	Course Code	Course
1	17HOE661	LabVIEW – Level 1
2	17HOE662	Yoga and Meditation
3	17HOE663	Martial Arts
4	17HOE664	Music (Carnatic Vocal / Instrumental)
5	17HOE665	Dance
6	17HOE666	Sports
7	17HOE667	Online Certification Courses from IITs / IISc / SWAYAM / EDX

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY  
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGG**

**Seventh Semester B.E. – Scheme**

Sl. No.	Course Code	Course	TeachingDept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16ECT71	Power Electronics	EC	3-0-0-0	3	100
2	16ECT72	Data Communication	EC	3-0-0-0	3	100
3	16ECI73X	Foundation Elective-X (IC)	EC	3-0-2-0	4	100
4	16ECT74X	Engineering Elective-XI	EC/ME/CS	3-0-0-0	3	100
5	16HOE75X	Open Elective-XII	EC/BS&H	2-0-0-4	3	100
6	16HOE76X	Open Elective-XIII	EC/BS&H	2-0-0-4	3	100
7	16ECL77	Power Electronics Lab	EC	1-0-2-0	2	100
8	16ECL78	Data Communication Lab	EC	1-0-2-0	2	100
9	16ECP79	Project Phase-I and Seminar	EC	0-0-6-0	3	100
<b>Total</b>				<b>18-0-12-8</b>	<b>26</b>	<b>900</b>

**Foundation Elective-X (IC)**

Sl. No.	Course Code	Course
1	16ECI731	Optical Fiber Communication
2	16ECI732	Web Technology
3	16ECI733	Online Certification courses from IITs / IISc / SWAYAM / EDX

**Engineering Elective-XI / PBL**

Sl. No.	Course Code	Course
1	16ECT741	Wireless Communication
2	16ECT742	Artificial Intelligence
3	16ECT743	MEMS

### Open Elective-XII

Sl. No.	Course Code	Course
1	16HOE751	Tax Management
2	16HOE752	Assessment of Building Energy Performance (Of-fered by ASHRAE)
3	16HOE753	Crisis Management
4	16HOE754	Online certification courses from IITs / IISC /SWAYAM / EDX

### Open Elective-XIII

Sl. No.	Course Code	Course
1	16HOE761	Small & Medium Enterprise Management
2	16HOE762	Occupational Safety & Health Administration
3	16HOE763	Animation & Multimedia Engineering
4	16HOE774	Online certification courses from IITs / IISC /SWAYAM / EDX

**NAGARJUNA COLLEGE OF ENGINEERING &  
TECHNOLOGY DEPARTMENT OF ELECTRONICS  
& COMMUNICATION ENGG**

**Eighth Semester B.E. – Scheme**

SI. No.	Course Code	Course	Teaching Dept.	Total Credits	Marks
1	16ECP81	Project Phase-II and Seminar	EC	4	100
2	16ECP82	Project Phase-III and Seminar	EC	4	100
3	16ECP83	Evaluation and Viva voce (External)	EC	10	100
<b>Total</b>				<b>18</b>	<b>300</b>



**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System CBCS**

***Outcome Based Education Curriculum***

**2018-2019**

Department of Electronics & Communication Engineering

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, Venkatagirikote Post, Devanahalli taluk,  
Bangalore district - 562 164



**An Autonomous College under VTU**

## **DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

### **VISION**

To transform the students as leaders in Electronics & Communication Engineering to achieve professional excellence in the challenging future

### **MISSION**

- M1: To create an environment for the students to have strong academic fundamentals and enable them to be life-long learners.
- M2: To provide modern tools to the students in the field of electronics and communication to meet the real-world challenges.
- M3: To develop Communication skill, leadership qualities, team work and skills for continuing education among the students.
- M4: To inculcate Ethics, Human values and skills for solving societal problems and environmental protection.
- M5: Validate engineering knowledge through innovative research projects to enhance their employability and entrepreneurship skills.

### **III to VIII Semesters Scheme and Syllabus With effect from Academic Year 2018-19**

## **Program Educational Objectives (PEOs)**

**PEO-1:** Graduates of Electronics and Communication engineering will be using the basic academic knowledge of design and analysis required in the industry for sustainable societal growth.

**PEO-2:** Graduates of Electronics and Communication engineering will be able to design project based learning and team based learning.

**PEO-3:** Graduates in Electronics and Communication engineering will demonstrate good communication skills, dynamic leadership qualities with concern for environmental protection.

**PEO-4:** Electronics and Communication engineering graduates will be capable of pursuing higher studies, take up research and development work blended with ethics and human values.

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## **Program Outcomes and Program Specific Outcomes as defined by the Program**

### **Program Outcome:**

**PO1:** Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and electronics and communication engineering principles to the solution of complex problems in electronics and communication engineering.

**PO2:** Problem Analysis: Identify, formulate, research literature, and analyze complex electronics and communication engineering problems reaching substantiated conclusions using first principles of mathematics, and engineering sciences.

**PO3:** Design/Development of Solutions: Design solutions for complex electronics and communication engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4:** Conduct Investigations of Complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions related to electronics and communication engineering problems.

**PO5:** Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex electronics and communication engineering activities with an understanding of the limitations.

**PO6:** The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities

relevant to the professional electronics and communication engineering practice.

**PO7: Environment and Sustainability:** Understand the impact of the professional electronics and communication engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

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**PO10: Communication:** Communicate effectively on complex electronics and communication engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11: Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12: Life Long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### **Program Specific Outcome (PSO):**

**PSO1.** Graduate will be able to identify, analyze & solve the problems related to Electronics and Communication Engineering by applying the fundamental knowledge of Electronics and Communication.

**PSO2.** Graduate will demonstrate an ability to investigate, design and develop both software and hardware using significant knowledge of modern tools in Electronics and Communication Engineering.

**PSO3.** Graduate will be able to apply their knowledge to assess societal, environmental, health, safety issues with professional ethics and can also pursue higher studies, involve in research activities, be employable or entrepreneur.



**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY  
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGG**

**Third Semester B.E.-Scheme**

Sl. No.	CourseCode	Course	TeachingDept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17ECM31	Engineering Mathematics-III(IC)	Mathematics	3-0-2-0	4	100
2	17ECT32	Analog Electronic Circuits	EC	3-0-0-0	3	100
3	17ECT33	Logic Design	EC	3-0-0-0	3	100
4	17ECT34	Field Theory	EC	4-0-0-0	4	100
5	17ECI35	Network Analysis (IC)	EC	3-0-2-0	4	100
6	17ECI36X	Foundation Elective-I (IC)	EC	2-0-2-0	3	100
7	17ECL37	Analog Electronics CircuitsLaboratory	EC	1-0-2-0	2	100
8	17ECL38	Logic Design Laboratory	EC	1-0-2-0	2	100
9	17ECH39	Integrated Rural Development– Part 1	EC	0-2-0-0	1	100
		<b>TOTAL</b>		<b>20-2-8-0</b>	<b>26</b>	<b>900</b>

**Foundation Elective–I (IC)**

Sl. No.	Course Code	Course
1	17ECI361	Computer Communication and Networking
2	17ECI362	Creating Interactive and Responsive Web Pages
3	17ECI363	Electronic Instrumentation

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGG**

**Fourth Semester B.E.-Scheme**

Sl. No	CourseCode	Course	TeachingDept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17ECM41	Engineering Mathematics-IV (IC)	Mathematics	3-0-2-0	4	100
2	17ECT42	Microprocessor	EC	4-0-0-0	4	100
3	17ECT43	Fundamentals of HDL	EC	3-0-0-0	3	100
4	17ECT44	Signals and Systems	EC	3-0-0-0	3	100
5	17ECI45X	Foundation Elective-II (IC)	EC	3-0-2-0	4	100
6	17ECT46X	Engineering Elective-III	EC	3-0-0-0	3	100
7	17ECL47	Microprocessors Laboratory	EC	1-0-2-0	2	100
8	17ECL48	HDL Laboratory	EC	1-0-2-0	2	100
9	17ECH49	Integrated Rural Development – Part 2	EC	0-2-0-0	1	100
<b>TOTAL</b>				<b>21-2-8-0</b>	<b>26</b>	<b>900</b>

**Foundation Elective-II (IC)**

Sl. No	Course Code	Course
1	17ECI451	Linear Integrated Circuits
2	17ECI452	Fundamentals of VLSI
3	17ECI453	Introduction to Programming using Python

**Engineering Elective-III**

Sl. No	Course Code	Course
1	17ECT461	Renewable Energy Resources
2	17ECT462	Object Oriented Programming using C++
3	17ECT463	Smart Materials
4	17ECT464	Management Information Systems

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY  
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGG**

**Fifth Semester B.E.-Scheme**

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16ECT51	Communication Systems	EC	3-0-0-0	3	100
2	16ECT52	Microcontrollers	EC	3-0-0-0	3	100
3	16ECT53	Information Theory and Coding	EC	3-0-0-0	3	100
4	16ECI54X	Foundation Elective-IV (IC)	EC	3-0-2-0	4	100
5	16ECI55X	Foundation Elective-V (IC)	EC	3-0-2-0	4	100
6	16ECT56X	Engineering Elective-VI/ PBL	EC/ME	3-0-0-0	3	100
7	16ECL57	Microcontroller Lab	EC	1-0-2-0	2	100
8	16ECL58	Communication System Lab	EC	1-0-2-0	2	100
9	16ECH59	General Aptitude	EC/BS&H	2-0-0-0	2	100
<b>Total</b>				<b>22-0-8-0</b>	<b>26</b>	<b>900</b>

**Foundation Elective-IV (IC)**

SI. No.	Course Code	Course
1	16ECI541	Control Systems
2	16ECI542	Low power VLSI Design
3	16ECI543	Microwave & Radar

**Foundation Elective-V (IC)**

SI. No.	Course Code	Course
1	16ECI551	Digital System Design using Verilog
2	16ECI552	Object Oriented Programming with JAVA
3	16ECI553	Online Certification course from IITs / IISc / SWAYAM / EDX

**Engineering Elective-VI / PBL**

SI. No.	Course Code	Course
1	16ECT561	Mechatronics
2	16ECT562	Energy Engineering and Management
3	16ECT563	Linear Algebra
4	16ECT564	Management Information Systems

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGG**

**Sixth Semester B.E.-Scheme**

Sl. No	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16ECT61	Digital Signal Processing	EC	4-0-0-0	4	100
2	16ECT62	Digital Communication	EC	4-0-0-0	4	100
3	16ECI63X	Foundation Elective-VII (IC)	EC	3-0-2-0	4	100
4	16ECT64X	Engineering Elective-VIII/PBL	EC	3-0-0-0	3	100
5	16ECL65	Digital Signal Processing Lab	EC	1-0-2-0	2	100
6	16HOE66X	Open Elective-IX	EC/BS&H	2-0-0-4	3	100
7	16ECL67	Digital Communication Lab	EC	1-0-2-0	2	100
8	16ECH68	Technical aptitude and GD	EC/BS&H	2-0-0-0	2	100
9	16ECP69	Mini Project and Seminar	EC	0-0-4-0	2	100
<b>Total</b>				<b>20-0-10-4</b>	<b>26</b>	<b>900</b>

**Foundation Elective-VII (IC)**

Sl. No.	Course Code	Course
1	16ECI631	Antenna and Propagation
2	16ECI632	Database Concepts
3	16ECI633	Online certification courses from IITs / IISC / SWAYAM / EDX

**Engineering Elective-VIII / PBL**

Sl. No.	Course Code	Course
1	16ECT641	Operations Research
2	16ECT642	Robotics
3	16ECT643	Internet of Things (IoT)

**Open Elective-VIII**

Sl. No.	Course Code	Course
1	16HOE661	LabVIEW – Level 1
2	16HOE662	Yoga and Meditation
3	16HOE663	Martial Arts
4	16HOE664	Music (Carnatic Vocal / Instrumental)
5	16HOE665	Dance
6	16HOE666	Sports
7	16HOE667	Online Certification Courses from IITs / IISc / SWAYAM / EDX

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGG**

**Seventh Semester B.E. – Scheme**

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	15ECT71	Power Electronics	EC	3-0-0-0	3	100
2	15ECT72	Data Communication	EC	3-0-0-0	3	100
3	15ECI73X	Foundation Elective-X (IC)	EC	3-0-2-0	4	100
4	15ECT74X	Engineering Elective-XI	EC/ME/CS	3-0-0-0	3	100
5	15HOE75X	Open Elective-XII	EC/BS&H	2-0-0-4	3	100
6	15HOE76X	Open Elective-XIII	EC/BS&H	2-0-0-4	3	100
7	15ECL77	Power Electronics Lab	EC	1-0-2-0	2	100
8	15ECL78	Data Communication Lab	EC	1-0-2-0	2	100
9	15ECP79	Project Phase-I and Seminar	EC	0-0-6-0	3	100
<b>Total</b>				<b>18-0-12-8</b>	<b>26</b>	<b>900</b>

**Foundation Elective-X (IC)**

Sl. No.	Course Code	Course
1	15ECI731	Optical Fiber Communication
2	15ECI732	Web Technology
3	15ECI733	Online Certification courses from IITs / IISc / SWAYAM / EDX

**Engineering Elective-XI / PBL**

Sl. No.	Course Code	Course
1	15ECT741	Wireless Communication
2	15ECT742	Artificial Intelligence
3	15ECT743	MEMS

### Open Elective-XII

Sl. No.	Course Code	Course
1	15HOE751	Tax Management
2	15HOE752	Assessment of Building Energy Performance (Of-fered by ASHRAE)
3	15HOE753	Crisis Management
4	15HOE754	Online certification courses from IITs / IISC /SWAYAM / EDX

### Open Elective-XIII

Sl. No.	Course Code	Course
1	15HOE761	Small & Medium Enterprise Management
2	15HOE762	Occupational Safety & Health Administration
3	15HOE763	Animation & Multimedia Engineering
4	15HOE774	Online certification courses from IITs / IISC /SWAYAM / EDX

**NAGARJUNA COLLEGE OF ENGINEERING &  
TECHNOLOGY DEPARTMENT OF ELECTRONICS  
& COMMUNICATION ENGG**

**Eighth Semester B.E. – Scheme**

SI. No.	Course Code	Course	Teaching Dept.	Total Credits	Marks
1	15ECP81	Project Phase-II and Seminar	EC	4	100
2	15ECP82	Project Phase-III and Seminar	EC	4	100
3	15ECP83	Evaluation and Viva voce (External)	EC	10	100
<b>Total</b>				<b>18</b>	<b>300</b>



**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System CBCS**

***Outcome Based Education Curriculum***

***2017-2018***

Department of Electronics & Communication Engineering

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, Venkatagirikote Post, Devanahalli taluk,  
Bangalore district - 562 164





**An Autonomous College under VTU**

## **DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

### **VISION**

To transform the students as leaders in Electronics & Communication Engineering to achieve professional excellence in the challenging future

### **MISSION**

- M1: To create an environment for the students to have strong academic fundamentals and enable them to be life-long learners.
- M2: To provide modern tools to the students in the field of electronics and communication to meet the real-world challenges.
- M3: To develop Communication skill, leadership qualities, team work and skills for continuing education among the students.
- M4: To inculcate Ethics, Human values and skills for solving societal problems and environmental protection.
- M5: Validate engineering knowledge through innovative research projects to enhance their employability and entrepreneurship skills.

### **III to VIII Semesters Scheme and Syllabus With effect from Academic Year 2017-18**

## **Program Educational Objectives (PEOs)**

**PEO-1:** Graduates of Electronics and Communication engineering will be using the basic academic knowledge of design and analysis required in the industry for sustainable societal growth.

**PEO-2:** Graduates of Electronics and Communication engineering will be able to design project based learning and team based learning.

**PEO-3:** Graduates in Electronics and Communication engineering will demonstrate good communication skills, dynamic leadership qualities with concern for environmental protection.

**PEO-4:** Electronics and Communication engineering graduates will be capable of pursuing higher studies, take up research and development work blended with ethics and human values.

**PEO-5:** Electronics and Communication engineering graduates will have the ability to get employed and become entrepreneurs thereby switching over from responsive engineering to creative engineering.

## **Program Outcomes and Program Specific Outcomes as defined by the Program**

### **Program Outcome:**

**PO1:** Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and electronics and communication engineering principles to the solution of complex problems in electronics and communication engineering.

**PO2:** Problem Analysis: Identify, formulate, research literature, and analyze complex electronics and communication engineering problems reaching substantiated conclusions using first principles of mathematics, and engineering sciences.

**PO3:** Design/Development of Solutions: Design solutions for complex electronics and communication engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4:** Conduct Investigations of Complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions related to electronics and communication engineering problems.

**PO5:** Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex electronics and communication engineering activities with an understanding of the limitations.

**PO6:** The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities

relevant to the professional electronics and communication engineering practice.

**PO7: Environment and Sustainability:** Understand the impact of the professional electronics and communication engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the electronics and communication engineering practice.

**PO9: Individual and Teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10: Communication:** Communicate effectively on complex electronics and communication engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11: Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12: Life Long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### **Program Specific Outcome (PSO):**

**PSO1.** Graduate will be able to identify, analyze & solve the problems related to Electronics and Communication Engineering by applying the fundamental knowledge of Electronics and Communication.

**PSO2.** Graduate will demonstrate an ability to investigate, design and develop both software and hardware using significant knowledge of modern tools in Electronics and Communication Engineering.

**PSO3.** Graduate will be able to apply their knowledge to assess societal, environmental, health, safety issues with professional ethics and can also pursue higher studies, involve in research activities, be employable or entrepreneur.

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY  
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGG**

**Third Semester B.E.-Scheme**

Sl. No	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16ECM31	Engineering Mathematics-III(IC)	Mathematics	3-0-2-0	4	100
2	16ECT32	Analog Electronic Circuits	EC	3-0-0-0	3	100
3	16ECT33	Logic Design	EC	3-0-0-0	3	100
4	16ECT34	Field Theory	EC	4-0-0-0	4	100
5	16ECT35	Network Analysis (IC)	EC	3-0-2-0	4	100
6	16ECI36X	Foundation Elective-I (IC)	EC	2-0-2-0	3	100
7	16ECL37	Analog Electronics Circuits Laboratory	EC	1-0-2-0	2	100
8	16ECL38	Logic Design Laboratory	EC	1-0-2-0	2	100
9	16ECH39	Soft Skills Development	EC	0-2-0-0	1	100
<b>TOTAL</b>				<b>20-2-8-0</b>	<b>26</b>	<b>900</b>

**Foundation Elective-I (IC)**

SI. No	Course Code	Course
1	16ECI361	Computer Communication and Networking
2	16ECI362	Creating Interactive and Responsive Web Pages
3	16ECI363	Electronic Instrumentation

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY  
 DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGG**

**Fourth Semester B.E.-Scheme**

Sl. No	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16ECM41	Engineering Mathematics -IV (IC)	Mathematics	3-0-2-0	4	100
2	16ECT42	Microprocessor	EC	4-0-0-0	4	100
3	16ECT43	Fundamentals of HDL	EC	3-0-0-0	3	100
4	16ECT44	Signals and Systems	EC	3-0-0-0	3	100
5	16ECI45X	Foundation Elective-II (IC)	EC	3-0-2-0	4	100
6	16ECT46X	Engineering Elective-III	EC	3-0-0-0	3	100
7	16ECL47	Microprocessors Laboratory	EC	1-0-2-0	2	100
8	16ECL48	HDL Laboratory	EC	1-0-2-0	2	100
9	16ECH49	Soft Skills Development	EC	0-2-0-0	1	100
<b>TOTAL</b>				<b>21-2-8-0</b>	<b>26</b>	<b>900</b>

**Foundation Elective-II (IC)**

Sl. No	Course Code	Course
1	16ECI451	Linear Integrated Circuits
2	16ECI452	Fundamentals of VLSI
3	16ECI453	Introduction to Programming using Python

**Engineering Elective-III**

Sl. No	Course Code	Course
1	16ECT461	Renewable Energy Resources
2	16ECT462	Object Oriented Programming using C++
3	16ECT463	Smart Materials
4	16ECT464	Management Information Systems

**NAGARJUNA COLLEGE OF ENGINEERING &  
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& COMMUNICATION ENGG**

**Fifth Semester B.E.-Scheme**

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	15ECT51	Communication Systems	EC	3-0-0-0	3	100
2	15ECT52	Microcontrollers	EC	3-0-0-0	3	100
3	15ECT53	Information Theory and Coding	EC	3-0-0-0	3	100
4	15ECI54X	Foundation Elective-IV (IC)	EC	3-0-2-0	4	100
5	15ECI55X	Foundation Elective-V (IC)	EC	3-0-2-0	4	100
6	15ECT56X	Engineering Elective-VI / PBL	EC/ME	3-0-0-0	3	100
7	15ECL57	Microcontroller Lab	EC	1-0-2-0	2	100
8	15ECL58	Communication System Lab	EC	1-0-2-0	2	100
9	15ECH59	General Aptitude	EC/BS&H	2-0-0-0	2	100
<b>Total</b>				<b>22-0-8-0</b>	<b>26</b>	<b>900</b>

**Foundation Elective-IV (IC)**

SI. No.	Course Code	Course
1	15ECI541	Control Systems
2	15ECI542	Low power VLSI Design
3	15ECI543	Microwave & Radar

**Foundation Elective-V (IC)**

SI. No.	Course Code	Course
1	15ECI551	Digital System Design using Verilog
2	15ECI552	Object Oriented Programming with JAVA
3	15ECI553	Online Certification course from IITs / IISc / SWAYAM / EDX

**Engineering Elective-VI / PBL**

SI. No.	Course Code	Course
1	15ECT561	Mechatronics
2	15ECT562	Energy Engineering and Management
3	15ECT563	Linear Algebra
4	15ECT564	Management Information Systems

**NAGARJUNA COLLEGE OF ENGINEERING &  
 TECHNOLOGY DEPARTMENT OF ELECTRONICS  
 & COMMUNICATION ENGG**

**Sixth Semester B.E.-Scheme**

Sl. No	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	15ECT61	Digital Signal Processing	EC	4-0-0-0	4	100
2	15ECT62	Digital Communication	EC	4-0-0-0	4	100
3	15ECI63X	Foundation Elective-VII (IC)	EC	3-0-2-0	4	100
4	15ECT64X	Engineering Elective-VIII/PBL	EC	3-0-0-0	3	100
5	15ECL65	Digital Signal Processing Lab	EC	1-0-2-0	2	100
6	15HOE66X	Open Elective-IX	EC/BS&H	2-0-0-4	3	100
7	15ECL67	Digital Communication Lab	EC	1-0-2-0	2	100
8	15ECH68	Technical aptitude and GD	EC/BS&H	2-0-0-0	2	100
9	15ECP69	Mini Project and Seminar	EC	0-0-4-0	2	100
<b>Total</b>				<b>20-0-10-4</b>	<b>26</b>	<b>900</b>

**Foundation Elective-VII (IC)**

Sl. No.	Course Code	Course
1	15ECI631	Antenna and Propagation
2	15ECI632	Database Concepts
3	15ECI633	Online certification courses from IITs / IISC / SWAYAM / EDX

**Engineering Elective-VIII / PBL**

Sl. No.	Course Code	Course
1	15ECT641	Operations Research
2	15ECT642	Robotics
3	15ECT643	Internet of Things (IoT)

**Open Elective-VIII**

Sl. No.	Course Code	Course
1	15HOE661	LabVIEW – Level 1
2	15HOE662	Yoga and Meditation
3	15HOE663	Martial Arts
4	15HOE664	Music (Carnatic Vocal / Instrumental)
5	15HOE665	Dance
6	15HOE666	Sports
7	15HOE667	Online Certification Courses from IITs / IISc / SWAYAM / EDX

**NAGARJUNA COLLEGE OF ENGINEERING &  
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 & COMMUNICATION ENGG**

**Seventh Semester B.E. – Scheme**

Sl. No.	Subject Code	Title of the Subject	Teaching Dept.	Teaching Hrs / Week		Examination			
				Theory	Practical	Duration (Hrs)	Marks		
							IA	Theory / Practical	Total
1	10EC71	Computer Communication Networks	EC	4	-	3	25	100	125
2	10EC72	Optical Fiber Communication	EC	4	-	3	25	100	125
3	10EC73	Power Electronics	EC	4	-	3	25	100	125
4	10EC74	Embedded System Design	EC	4	-	3	25	100	125
5	10EC75x	<b>Elective-II (Group B)</b>	EC	4	-	3	25	100	125
6	10EC76x	<b>Elective-III (Group C)</b>	EC	4	-	3	25	100	125
7	10ECL77	VLSI Lab	EC	-	3	3	25	50	75
8	10ECL78	Power Electronics Lab	EC	-	3	3	25	50	75
<b>TOTAL</b>				<b>24</b>	<b>06</b>	<b>24</b>	<b>200</b>	<b>700</b>	<b>900</b>

**Elective-II (Group B)**

10EC751 – DSP Algorithms & Architecture  
 10EC752 - Micro and Smart Systems Technology  
 10EC753 – Artificial Neural Network  
 10EC754 – CAD for VLSI  
 Integrated Circuits  
 10EC755 – Applied Embedded System Design\*  
 10EC756 – Speech Processing  
 of Data Networks

**Elective-III (Group C)**

10EC761 - Programming in C++  
 10EC762 – Real Time Systems  
 10EC763 - Image Processing  
 10EC764 - Radio Frequency  
  
 10EC765 - Wavelet Transforms  
 10EC766 - Modeling and Simulation



**NAGARJUNA COLLEGE OF ENGINEERING &  
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 & COMMUNICATION ENGG**

**Eighth Semester B.E. – Scheme**

Sl. No.	Subject Code	Title of the Subject	Teaching Dept.	Teaching Hrs / Week		Examination			
				Theory	Practical	Duration (Hrs)	Marks		
							IA	Theory / Practical	Total
1	10EC81	Wireless Communication	EC	4	-	3	25	100	125
2	10EC82	Digital Switching System	EC	4	-	3	25	100	125
3	10EC83x	Elective-IV (Group D)	EC	4	-	3	25	100	125
4	10EC84x	Elective-V (Group E)	EC	4	-	3	25	100	125
5	10ECP85	Project Work	EC	-	6	3	100	100	200
6	10ECS86	Seminar	EC	-	3	-	50	-	50
<b>TOTAL</b>				<b>16</b>	<b>09</b>	<b>15</b>	<b>250</b>	<b>500</b>	<b>750</b>

**Elective-IV (Group-D)**

10EC831 – Distributed Systems  
 Communication  
 10EC832 – Network Security  
 Systems  
 10EC833 - Optical Networks  
 10EC834 – High Performance Computing Networks  
 10EC835 – Internet Engineering

**Elective-V (Group-E)**

10EE841 – Multimedia  
 10EC842 – Real Time Operating  
 10EC843 - GSM  
 10EC844 - Ad-hoc Wireless Networks  
 10EC845 – Optical Computing



**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System CBCS**

***Outcome Based Education Curriculum***

***2016-2017***

Department of Electronics & Communication Engineering

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, Venkatagirikote Post, Devanahalli taluk,  
Bangalore district - 562 164



**An Autonomous College under VTU**

## **DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

### **VISION**

To transform the students as leaders in Electronics & Communication Engineering to achieve professional excellence in the challenging future

### **MISSION**

- M1: To create an environment for the students to have strong academic fundamentals and enable them to be life-long learners.
- M2: To provide modern tools to the students in the field of electronics and communication to meet the real-world challenges.
- M3: To develop Communication skill, leadership qualities, team work and skills for continuing education among the students.
- M4: To inculcate Ethics, Human values and skills for solving societal problems and environmental protection.
- M5: Validate engineering knowledge through innovative research projects to enhance their employability and entrepreneurship skills.

### **III to VIII Semesters Scheme and Syllabus With effect from Academic Year 2016-17**

## **Program Educational Objectives (PEOs)**

**PEO-1:** Graduates of Electronics and Communication engineering will be using the basic academic knowledge of design and analysis required in the industry for sustainable societal growth.

**PEO-2:** Graduates of Electronics and Communication engineering will be able to design project based learning and team based learning.

**PEO-3:** Graduates in Electronics and Communication engineering will demonstrate good communication skills, dynamic leadership qualities with concern for environmental protection.

**PEO-4:** Electronics and Communication engineering graduates will be capable of pursuing higher studies, take up research and development work blended with ethics and human values.

**PEO-5:** Electronics and Communication engineering graduates will have the ability to get employed and become entrepreneurs thereby switching over from responsive engineering to creative engineering.

## **Program Outcomes and Program Specific Outcomes as defined by the Program**

### **Program Outcome:**

**PO1:** Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and electronics and communication engineering principles to the solution of complex problems in electronics and communication engineering.

**PO2:** Problem Analysis: Identify, formulate, research literature, and analyze complex electronics and communication engineering problems reaching substantiated conclusions using first principles of mathematics, and engineering sciences.

**PO3:** Design/Development of Solutions: Design solutions for complex electronics and communication engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4:** Conduct Investigations of Complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions related to electronics and communication engineering problems.

**PO5:** Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex electronics and communication engineering activities with an understanding of the limitations.

**PO6:** The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities

relevant to the professional electronics and communication engineering practice.

**PO7: Environment and Sustainability:** Understand the impact of the professional electronics and communication engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

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**PO9: Individual and Teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10: Communication:** Communicate effectively on complex electronics and communication engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11: Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12: Life Long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### **Program Specific Outcome (PSO):**

**PSO1.** Graduate will be able to identify, analyze & solve the problems related to Electronics and Communication Engineering by applying the fundamental knowledge of Electronics and Communication.

**PSO2.** Graduate will demonstrate an ability to investigate, design and develop both software and hardware using significant knowledge of modern tools in Electronics and Communication Engineering.

**PSO3.** Graduate will be able to apply their knowledge to assess societal, environmental, health, safety issues with professional ethics and can also pursue higher studies, involve in research activities, be employable or entrepreneur.

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGG**

**Third Semester B.E.-Scheme**

Sl. No	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	15ECM31	Engineering Mathematics-III(IC)	Mathematics	3-0-2-0	4	100
2	15ECT32	Analog Electronic Circuits	EC	3-0-0-0	3	100
3	15ECT33	Logic Design	EC	3-0-0-0	3	100
4	15ECT34	Field Theory	EC	4-0-0-0	4	100
5	15ECT35	Network Analysis (IC)	EC	3-0-2-0	4	100
6	15ECI36X	Foundation Elective-I (IC)	EC	2-0-2-0	3	100
7	15ECL37	Analog Electronics Circuits Laboratory	EC	1-0-2-0	2	100
8	15ECL38	Logic Design Laboratory	EC	1-0-2-0	2	100
9	15ECH39	Soft Skills Development	EC	0-2-0-0	1	100
<b>TOTAL</b>				<b>20-2-8-0</b>	<b>26</b>	<b>900</b>

**Foundation Elective-I (IC)**

SI. No	Course Code	Course
1	15ECI361	Computer Communication and Networking
2	15ECI362	Creating Interactive and Responsive Web Pages
3	15ECI363	Electronic Instrumentation

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGG**

**Fourth Semester B.E.-Scheme**

Sl. No	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	15ECM41	Engineering Mathematics -IV (IC)	Mathematics	3-0-2-0	4	100
2	15ECT42	Microprocessor	EC	4-0-0-0	4	100
3	15ECT43	Fundamentals of HDL	EC	3-0-0-0	3	100
4	15ECT44	Signals and Systems	EC	3-0-0-0	3	100
5	15ECI45X	Foundation Elective-II (IC)	EC	3-0-2-0	4	100
6	15ECT46X	Engineering Elective-III	EC	3-0-0-0	3	100
7	15ECL47	Microprocessors Laboratory	EC	1-0-2-0	2	100
8	15ECL48	HDL Laboratory	EC	1-0-2-0	2	100
9	15ECH49	Soft Skills Development	EC	0-2-0-0	1	100
<b>TOTAL</b>				<b>21-2-8-0</b>	<b>26</b>	<b>900</b>

**Foundation Elective-II (IC)**

Sl. No	Course Code	Course
1	15ECI451	Linear Integrated Circuits
2	15ECI452	Fundamentals of VLSI
3	15ECI453	Introduction to Programming using Python

**Engineering Elective-III**

Sl. No	Course Code	Course
1	15ECT461	Renewable Energy Resources
2	15ECT462	Object Oriented Programming using C++
3	15ECT463	Smart Materials
4	15ECT464	Management Information Systems

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& COMMUNICATION ENGG

Fifth Semester B.E.-Scheme

Sl. No.	Subject Code	Title of the Subject	Teaching Dept.	Teaching Hrs / Week		Examination			
				Theory	Practical	Duration (Hrs)	Marks		
							IA	Theory / Practical	Total
01	10AL51	Management and Entrepreneurship	EC	4	-	3	25	100	125
02	10EC52	Digital Signal Processing	EC	4	-	3	25	100	125
03	10EC53	Analog Communication	EC	4	-	3	25	100	125
04	10EC54	Microwaves and Radar	EC	4	-	3	25	100	125
05	10EC55	Information Theory and Coding	EC	4	-	3	25	100	125
06	10EC56	Fundamentals of CMOS VLSI	EC	4	-	3	25	100	125
07	10ECL57	DSP Lab	EC	-	3	3	25	50	75
08	10ECL58	Analog Communication Lab + LIC Lab	EC	-	3	3	25	50	75
<b>TOTAL</b>				<b>24</b>	<b>06</b>	<b>24</b>	<b>200</b>	<b>700</b>	<b>900</b>



**NAGARJUNA COLLEGE OF ENGINEERING &  
 TECHNOLOGY DEPARTMENT OF ELECTRONICS  
 & COMMUNICATION ENGG**

**Sixth Semester B.E.-Scheme**

Sl. No.	Subject Code	Title of the Subject	Teaching Dept.	Teaching Hrs / Week		Examination			
				Theory	Practical	Duration (Hrs)	Marks		
							IA	Theory / Practical	Total
1	10EC61	Digital Communication	EC	4	-	3	25	100	125
2	10EC62	Microprocessors	EC	4	-	3	25	100	125
3	10EC63	Microelectronics Circuits	EC	4	-	3	25	100	125
4	10EC64	Antennas and Propagation	EC	4	-	3	25	100	125
5	10EC65	Operating Systems	EC	4	-	3	25	100	125
6	10EC66x	<b>Elective-I (Group A)</b>	EC	4	-	3	25	100	125
7	10ECL67	Advanced Communication Lab	EC	-	3	3	25	50	75
8	10ECL68	Microprocessor Lab	EC	-	3	3	25	50	75
<b>TOTAL</b>				<b>24</b>	<b>06</b>	<b>24</b>	<b>200</b>	<b>700</b>	<b>900</b>

**Elective-I (Group A)**

**10EC661 – Analog and Mixed Mode VLSI Design**

**10EC662 – Satellite Communications**

**10EC663 - Random Process**

**10EC664 – Low Power VLSI Design**

**10EC665 – Data Structure Using C++**

**10EC666 – Digital System Design Using Verilog**

**10EC667- Virtual Instrumentation**

**NAGARJUNA COLLEGE OF ENGINEERING &  
 TECHNOLOGY DEPARTMENT OF ELECTRONICS  
 & COMMUNICATION ENGG**

**Seventh Semester B.E. – Scheme**

Sl. No.	Subject Code	Title of the Subject	Teaching Dept.	Teaching Hrs / Week		Examination			
				Theory	Practical	Duration (Hrs)	Marks		
							IA	Theory / Practical	Total
1	10EC71	Computer Communication Networks	EC	4	-	3	25	100	125
2	10EC72	Optical Fiber Communication	EC	4	-	3	25	100	125
3	10EC73	Power Electronics	EC	4	-	3	25	100	125
4	10EC74	Embedded System Design	EC	4	-	3	25	100	125
5	10EC75x	<b>Elective-II (Group B)</b>	EC	4	-	3	25	100	125
6	10EC76x	<b>Elective-III (Group C)</b>	EC	4	-	3	25	100	125
7	10ECL77	VLSI Lab	EC	-	3	3	25	50	75
8	10ECL78	Power Electronics Lab	EC	-	3	3	25	50	75
<b>TOTAL</b>				<b>24</b>	<b>06</b>	<b>24</b>	<b>200</b>	<b>700</b>	<b>900</b>

**Elective-II (Group B)**

10EC751 – DSP Algorithms & Architecture  
 10EC752 - Micro and Smart Systems Technology  
 10EC753 – Artificial Neural Network  
 10EC754 – CAD for VLSI  
 Integrated Circuits  
 10EC755 – Applied Embedded System Design\*  
 10EC756 – Speech Processing  
 of Data Networks

**Elective-III (Group C)**

10EC761 - Programming in C++  
 10EC762 – Real Time Systems  
 10EC763 - Image Processing  
 10EC764 - Radio Frequency  
  
 10EC765 - Wavelet Transforms  
 10EC766 - Modeling and Simulation

**NAGARJUNA COLLEGE OF ENGINEERING &  
 TECHNOLOGY DEPARTMENT OF ELECTRONICS  
 & COMMUNICATION ENGG**

**Eighth Semester B.E. – Scheme**

Sl. No.	Subject Code	Title of the Subject	Teaching Dept.	Teaching Hrs / Week		Examination			
				Theory	Practical	Duration (Hrs)	Marks		
							IA	Theory / Practical	Total
1	10EC81	Wireless Communication	EC	4	-	3	25	100	125
2	10EC82	Digital Switching System	EC	4	-	3	25	100	125
3	10EC83x	Elective-IV (Group D)	EC	4	-	3	25	100	125
4	10EC84x	Elective-V (Group E)	EC	4	-	3	25	100	125
5	10ECP85	Project Work	EC	-	6	3	100	100	200
6	10ECS86	Seminar	EC	-	3	-	50	-	50
<b>TOTAL</b>				<b>16</b>	<b>09</b>	<b>15</b>	<b>250</b>	<b>500</b>	<b>750</b>

**Elective-IV (Group-D)**

10EC831 – Distributed Systems  
 Communication  
 10EC832 – Network Security  
 Systems  
 10EC833 - Optical Networks  
 10EC834 – High Performance Computing Networks  
 10EC835 – Internet Engineering

**Elective-V (Group-E)**

10EE841 – Multimedia  
 10EC842 – Real Time Operating  
 10EC843 - GSM  
 10EC844 - Ad-hoc Wireless Networks  
 10EC845 – Optical Computing



**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System CBCS**

***Outcome Based Education Curriculum***

**2019-2020**

Department of Information Science and Engineering

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, Venkatagirikote Post, Devanahalli taluk,  
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**DEPARTMENT OF INFORMATION SCIENCE  
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**VISION**

To disseminate the IT knowledge among the students for achieving excellence in education and to irradiate budding engineers as leaders in information technology

**MISSION**

- M1.** To maintain leadership and excellence in Information Technology.
- M2.** Achieving excellence in IT through analysis, design, development of software products.
- M3.** Developing communication skills, leadership qualities and team work among students community by providing opportunities to work on various projects through internship with industry partners.
- M4.** To inculcate Ethics and Human values for solving societal problems and environmental protection.
- M5.** Promoting research, higher studies and entrepreneurship among the students through outside world interaction.

**V & VIII Semesters**

***Scheme and Syllabus***

***With effect from Academic Year 2019-20***

### Fifth Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17IST51	Computer Networks	IS	3:0:0:0	3	100
2	17IST52	Microcontrollers	IS	3:0:0:0	3	100
3	17ISI53	Operating System (IC)	IS	3:0:2:0	4	100
4	17IST54	Software Engineering and Testing	IS	3:0:0:0	3	100
5	17ISI55X	Foundation Elective-IV(IC)	IS	3:0:2:0	4	100
6	17IST56X	Engineering Elective-V	IS	3:0:0:0	3	100
7	17ISL57	Computer Networks Laboratory	IS	1:0:2:0	2	100
8	17ISL58	Microcontroller Laboratory	IS	1:0:2:0	2	100
9	17ISH59	General Aptitude	IS/BS&H	2:0:0:0	2	100
<b>TOTAL</b>				<b>22:0:8:0</b>	<b>26</b>	<b>900</b>

### Foundation Elective-IV (IC)

Sl. No.	Course Code	Course
1	17ISI551	Advanced Algorithms
2	17ISI552	Object Oriented Programming with JAVA
3	17ISI553	Compiler Design(NPTEL/MOOCs)

### Engineering Elective-V / PBL

Sl. No.	Course Code	Course
1	17IST561	Operations Research
2	17IST562	Object Oriented Modeling and Design
3	17IST563	Computer Architecture (MOOCs)/ Information Security (MOOCs)

**Sixth Semester B.E. – Scheme**

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17IST61	Unix System programming	IS	3:0:0:0	3	100
2	17ISI62	Android Programming (IC)	IS	3:0:2:0	4	100
3	17IST63	Embedded System	IS	3:0:0:0	3	100
4	17ISI64X	Foundation Elective-VI (IC)	IS	3:0:2:0	4	100
5	17IST65X	Engineering Elective-VII	IS	3:0:0:0	3	100
6	17HOE66X	Open Elective-VIII	IS/BS&H	2:0:0:4	3	100
7	17ISL67	Unix System programming Laboratory	IS	1:0:2:0	2	100
8	17ISH68	Technical Aptitude and GD	IS/BS&H	2:0:0:0	2	100
9	17ISP69	Mini project and Seminar	IS	2:0:0:0	2	100
<b>Total</b>				<b>22:0:6:4</b>	<b>26</b>	<b>900</b>

**Foundation Elective-VI (IC)**

Sl. No.	Course Code	Course
1	17ISI641	Distributed Computing System
2	17ISI642	Database Concepts
3	17ISI643	Computer Graphics and Multimedia

**Engineering Elective-VII /PBL**

Sl. No.	Course Code	Course
1	17IST651	Data Mining
2	17IST652	Artificial Intelligence
3	17IST653	Introduction to CSS3 (MOOCS)

**Open Elective-VIII**

Sl. No.	Course Code	Course
1	17HOE661	Lab View – Level 1
2	17HOE662	Yoga and Meditation
3	17HOE663	Martial Arts
4	17HOE664	Music (Carnatic Vocal / Instrumental)
5	17HOE665	Dance
6	17HOE666	Sports
7	17HOE667	Online Certification Courses from IITs / IISc / SWAYAM / EDX

### Seventh Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17IST71	Internet of Things	IS	3:0:0:0	3	100
2	17IST72	Image Processing	IS	3:0:0:0	3	100
3	17ISI73X	Foundation Elective-IX (IC)	IS	3:0:2:0	4	100
4	17IST74X	Engineering Elective-X	IS	3:0:0:0	3	100
5	17HOE75X	Open Elective-XI	IS/BS&H/ME	2:0:0:4	3	100
6	17HOE76X	Open Elective-XII	IS/BS&H	2:0:0:4	3	100
7	17ISL77	Internet of Things Laboratory	IS	1:0:2:0	2	100
8	17ISL78	Image processing Laboratory	IS	1:0:2:0	2	100
9	17ISP79	Project Phase-I and Seminar	IS	0:0:6:0	3	100
		<b>Total</b>		<b>18:0:12:8</b>	<b>26</b>	<b>900</b>

#### Foundation Elective-IX (IC)

Sl. No.	Course Code	Course
1	17ISI731	Soft Computing
2	17ISI732	Big Data
3	17ISI733	Web Technologies – Servlet, JSP

#### Engineering Elective-X / PBL

Sl. No.	Course Code	Course
1	17IST741	System Modeling and Simulation
2	17IST742	Machine Learning (NPTEL/MOOCs)
4	17IST743	Project Planning and Control (MOOCs)

#### Open Elective-XI

Sl. No.	Course Code	Course
1	17HOE751	Tax Management
2	17HOE752	Assessment of Building Energy Performance (Offered by ASHRAE)
3	17HOE753	National Disaster Management and Mitigation
4	17HOE754	Online certification courses from IITs/IISc/SWAYAM/EDX

#### Open Elective-XII

Sl. No.	Course Code	Course
1	17HOE761	Small and Medium Enterprise Management
2	17HOE762	Occupational Safety and Health Administration
3	17HOE763	Animation and Multimedia Engineering
4	17HOE764	Online certification courses from IITs / IISc / SWAYAM / EDX



**Eighth Semester B.E. – Scheme**

Sl. No.	Course Code	Course Name	Teaching Dept.	Total Credits	Marks
1	17ISP81	Project Phase-II	IS	4	100
2	17ISP82	Project Phase-III	IS	4	100
3	17ISP83	Evaluation and Viva-voce (External)	IS	10	100
		<b>Total</b>		<b>18</b>	<b>300</b>

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study



**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System CBCS**

***Outcome Based Education Curriculum***

**2018-2019**

Department of Information Science and Engineering

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**V & VIII Semesters**

***Scheme and Syllabus***

***With effect from Academic Year 2018-19***

### Fifth Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16IST51	Computer Networks	IS	3-0-0-0	3	100
2	16IST52	Microcontrollers	IS	3-0-0-0	3	100
3	16ISI53	Operating System (IC)	IS	3-0-2-0	4	100
4	16IST54	Software Engineering and Testing	IS	3-0-0-0	3	100
5	16ISI55X	Foundation Elective-IV(IC)	IS	3-0-2-0	4	100
6	16IST56X	Engineering Elective-V	IS	3-0-0-0	3	100
7	16ISL57	Computer Networks Laboratory	IS	1-0-2-0	2	100
8	16ISL58	Microcontroller Laboratory	IS	1-0-2-0	2	100
9	16ISH59	General Aptitude	IS/BS&H	2-0-0-0	2	100
<b>TOTAL</b>				<b>22-0-8-0</b>	<b>26</b>	<b>900</b>

#### Foundation Elective-IV (IC)

Sl. No.	Course Code	Course
1	16ISI551	Advanced Algorithms
2	16ISI552	Object Oriented Programming with JAVA
3	16ISI553	Compiler Design(NPTEL/MOOCs)

#### Engineering Elective-V / PBL

Sl. No.	Course Code	Course
1	16IST561	Operations Research
2	16IST562	Object Oriented Modeling and Design
3	16IST563	Computer Architecture (MOOCs)/ Information Security (MOOCs)

**Sixth Semester B.E. – Scheme**

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16IST61	Unix System programming	IS	3-0-0-0	3	100
2	16ISI62	Android Programming (IC)	IS	3-0-2-0	4	100
3	16IST63	Embedded System	IS	3-0-0-0	3	100
4	16ISI64X	Foundation Elective-VI (IC)	IS	3-0-2-0	4	100
5	16IST65X	Engineering Elective-VII	IS	3-0-0-0	3	100
6	16HOE66X	Open Elective-VIII	IS/BS&H	2-0-0-4	3	100
7	16ISL67	Unix System programming Laboratory	IS	1-0-2-0	2	100
8	16ISH68	Technical Aptitude and GD	IS/BS&H	2-0-0-0	2	100
9	16ISP69	Mini project and Seminar	IS	2-0-0-0	2	100
<b>Total</b>				<b>22-0-6-4</b>	<b>26</b>	<b>900</b>

**Foundation Elective-VI (IC)**

Sl. No.	Course Code	Course
1	16ISI641	Distributed Computing System
2	16ISI642	Database Concepts
3	16ISI643	Computer Graphics and Multimedia

**Engineering Elective-VII /PBL**

Sl. No.	Course Code	Course
1	16IST651	Data Mining
2	16IST652	Artificial Intelligence
3	16IST653	Introduction to CSS3 (MOOCS)

**Open Elective-VIII**

Sl. No.	Course Code	Course
1	16HOE661	Lab View – Level 1
2	16HOE662	Yoga and Meditation
3	16HOE663	Martial Arts
4	16HOE664	Music (Carnatic Vocal / Instrumental)
5	16HOE665	Dance
6	16HOE666	Sports
7	16HOE667	Online Certification Courses from IITs / IISc / SWAYAM / EDX

### Seventh Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16IST71	Internet of Things	IS	3-0-0-0	3	100
2	16IST72	Image Processing	IS	3-0-0-0	3	100
3	16ISI73X	Foundation Elective-IX (IC)	IS	3-0-2-0	4	100
4	16IST74X	Engineering Elective-X	IS	3-0-0-0	3	100
5	16HOE75X	Open Elective-XI	IS/BS&H/ME	2-0-0-4	3	100
6	16HOE76X	Open Elective-XII	IS/BS&H	2-0-0-4	3	100
7	16ISL77	Internet of Things Laboratory	IS	1-0-2-0	2	100
8	16ISL78	Image processing Laboratory	IS	1-0-2-0	2	100
9	16ISP79	Project Phase-I and Seminar	IS	0-0-6-0	3	100
		<b>Total</b>		<b>18-0-12-8</b>	<b>26</b>	<b>900</b>

#### Foundation Elective-IX (IC)

Sl. No.	Course Code	Course
1	16ISI731	Soft Computing
2	16ISI732	Big Data
3	16ISI733	Web Technologies – Servlet, JSP

#### Engineering Elective-X / PBL

Sl. No.	Course Code	Course
1	16IST741	System Modeling and Simulation
2	16IST742	Machine Learning (NPTEL/MOOCs)
4	16IST743	Project Planning and Control (MOOCs)

#### Open Elective-XI

Sl. No.	Course Code	Course
1	16HOE751	Tax Management
2	16HOE752	Assessment of Building Energy Performance (Offered by ASHRAE)
3	16HOE753	National Disaster Management and Mitigation
4	16HOE754	Online certification courses from IITs/IISc/SWAYAM/EDX

#### Open Elective-XII

Sl. No.	Course Code	Course
1	16HOE761	Small and Medium Enterprise Management
2	16HOE762	Occupational Safety and Health Administration
3	16HOE763	Animation and Multimedia Engineering
4	16HOE764	Online certification courses from IITs / IISc / SWAYAM / EDX

**Eighth Semester B.E. – Scheme**

Sl. No.	Course Code	Course Name	Teaching Dept.	Total Credits	Marks
1	16ISP81	Project Phase-II	IS	4	100
2	16ISP82	Project Phase-III	IS	4	100
3	16ISP83	Evaluation and Viva-voce (External)	IS	10	100
		<b>Total</b>		<b>18</b>	<b>300</b>

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study



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**DEPARTMENT OF INFORMATION  
SCIENCE  
& ENGINEERING**

**VISION**

Excellence in creating globally competent professionals and moulding them as leaders in Computer Science & Engineering education and research.

**MISSION**

- M1:** Maintaining excellence in Computer Science & Engineering education through academic professionalism, teaching, curricula which reflect the changing needs of the society.
- M2:** Establishing centre of excellence by creating knowledge through research and industrial exposure in the area of Computer Science & Engineering.
- M3:** Developing communication skill, leadership qualities, team work & skills for continuing education among the students.
- M4:** Inculcating ethics, human values and skills for solving societal problems and environmental protection.
- M5:** Validate engineering knowledge through innovative research projects to enhance their employability and entrepreneurship skills.

**III & IV Semesters**

***Scheme and Syllabus***

## **PROGRAM EDUCATIONAL OBJECTIVES (PEOs)**

The graduates of Information Science and Engineering are expected to fulfill the following PEOs after a few years of their graduation.

**PEO1:** Pursue a successful career in the field of Information Science & Engineering or a related field utilizing his/her education and contribute to the profession as an excellent employee, or as an entrepreneur.

**PEO2:** Be able to work effectively in multidisciplinary environments and be responsible members/leaders of their communities

**PEO3:** The graduates of Information Science and Engineering Program should be able to establish an understanding of professionalism, teamwork, ethics, public policy that allows them to become good professional Engineers

**PEO4:** The graduates of Information Science and Engineering Program should be able to provide novel engineering solutions and efficient software designs with legal and ethical responsibility.

**PEO5:** Continuously improve by pursuing advanced degrees in engineering, business, or other professional fields through formal means or through informal self-study.

## **PROGRAM OUTCOMES (POs):**

Graduates of the Information Science and Engineering Programme will be able to achieve the following POs:

### **PO1: Engineering Knowledge:**

Apply the knowledge of mathematics, science, engineering fundamentals, and **Information Science and Engineering** principles to the solution of complex problems in **Information Science and Engineering**.

### **PO2: Problem Analysis:**

Identify, formulate, research literature, and analyze complex **Information Science and Engineering** problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.

### **PO3: Design/Development of Solutions:**

Design solutions for complex **Information Science and Engineering** problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

#### **PO4: Conduct investigations of Complex problems:**

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions related to **Information Science and Engineering** problems.

#### **PO5: Modern Tool Usage:**

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex **Information Science and Engineering** activities with an understanding of the limitations.

#### **PO6: The Engineer and Society:**

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional **Information Science and Engineering** practice.

#### **PO7: Environment and Sustainability:**

Understand the impact of the professional **Information Science and Engineering** solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

#### **PO8: Ethics:**

Apply ethical principles and commit to professional ethics and responsibilities and norms of the **Information Science and Engineering** practice.

#### **PO9: Individual and Team work:**

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

#### **PO10: Communication:**

Communicate effectively on complex **Information Science and Engineering** activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

#### **PO11: Project Management and Finance:**

management principles and apply these to one's own work, as a member and leader in a team, to manage **Information Science and Engineering** projects and in multidisciplinary environments.

**PO12: Life Long Learning:**

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**PROGRAM SPECIFIC OUTCOMES (PSOs):**

Program Specific Outcomes (PSOs) are what the graduates of a specific undergraduate engineering program should be able to do at the time of graduation.

**PSO1: Professional Skills:**

The ability to understand, analyze and develop algorithms and write Information application programs in the areas related to information technology

**PSO2: Problem-Solving Skills:**

Ability to understand the ethics, human values for solving societal problems and environmental protection

**PSO3: Foundation of mathematical concepts:**

Ability to understand the software development skills and practical knowledge for promoting research, higher studies and entrepreneurship.

### Third Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	Total Credits	L-T-P-S (Hrs/week)	Marks
1	18CSM31	Integral Transforms & Applications (IC)	CSE / ISE	4	3:0:2:0	100
2	18CST32	Fundamentals of Computation Engineering	CSE / ISE	4	4:0:0:0	100
3	18CST33	Data Structures using C	CSE / ISE	4	4:0:0:0	100
4	18CSI34	Analog and Digital Electronics (IC)	CSE / ISE	4	3:0:0:0	100
5	18CSI35X	Foundation Elective-I (IC)	CSE / ISE	4	3:0:0:0	100
6	18CSL36	Data Structures Laboratory	CSE / ISE	2	1:0:2:0	100
7	18CSH37	Career Skill Development Programme	S & H	2	1:0:2:0	100
8	18CPH38	Constitution of India and Professional Ethics and Human Rights	S & H	1	1:0:0:0	100
		<b>Total</b>		<b>25</b>	<b>20:2:8:0</b>	<b>800</b>

### Foundation Elective-I (IC)

Sl. No.	Course Code	Course
1	18CSI351	Design of Dynamic Web Pages
2	18CSI352	Fundamentals of Multimedia
3	18CSI353	Unix and Shell Programming

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study

**Fourth Semester B.E. - Scheme**

Sl. No.	Course Code	Course	Teaching Dept.	Total Credits	L-T-P-S (Hrs/week)	Marks
1	18CSM41	Statistics and Probability Using R (IC)	CSE/ISE	4	3:0:2:0	100
2	18CST42	Design and Analysis of Algorithms	CSE/ISE	4	4:0:0:0	100
3	18CST43	Computer Organization and Architecture	CSE/ISE	4	4:0:0:0	100
4	18CSI44X	Foundation Elective-II (IC)	CSE/ISE	4	3:0:2:0	100
5	18EET45X	Engineering Elective-III	CSE/ISE	4	4:0:0:0	100
6	18CSL46	Design and Analysis of Algorithms Laboratory	CSE/ISE	2	1:0:2:0	100
7	18CSH47	Technical Report Writing & IRDP	S&H	2	1:0:2:0	100
8	18KAK38 / 18KAK38	Vyavaharika Kannada / Adalitha Kannada	S&H	1	1:0:0:0	100
<b>Total</b>				<b>25</b>	<b>21:0:8:0</b>	<b>800</b>

**Foundation Elective-II (IC)**

Sl. No.	Course Code	Course
1	18CSI441	Introduction to Embedded Processors
2	18CSI442	Cloud Computing and Virtualization
3	18CSI443	Object Oriented programming using JAVA (IC)

**Engineering Elective-III**

Sl. No.	Course Code	Course
1	18EET451	Renewable Energy Sources
2	18 EET452	Introduction to Cyber Security and Cyber Laws
3	18 EET453	Management Information Systems
4	18EET454	Environmental Air Pollution

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study

### Fifth Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17IST51	Computer Networks	IS	3:0:0:0	3	100
2	17IST52	Microcontrollers	IS	3:0:0:0	3	100
3	17ISI53	Operating System (IC)	IS	3:0:2:0	4	100
4	17IST54	Software Engineering and Testing	IS	3:0:0:0	3	100
5	17ISI55X	Foundation Elective-IV(IC)	IS	3:0:2:0	4	100
6	17IST56X	Engineering Elective-V	IS	3:0:0:0	3	100
7	17ISL57	Computer Networks Laboratory	IS	1:0:2:0	2	100
8	17ISL58	Microcontroller Laboratory	IS	1:0:2:0	2	100
9	17ISH59	General Aptitude	IS/BS&H	2:0:0:0	2	100
<b>TOTAL</b>				<b>22:0:8:0</b>	<b>26</b>	<b>900</b>

#### Foundation Elective-IV (IC)

Sl. No.	Course Code	Course
1	17ISI551	Advanced Algorithms
2	17ISI552	Object Oriented Programming with JAVA
3	17ISI553	Compiler Design(NPTEL/MOOCs)

#### Engineering Elective-V / PBL

Sl. No.	Course Code	Course
1	17IST561	Operations Research
2	17IST562	Object Oriented Modeling and Design
3	17IST563	Computer Architecture (MOOCs)/ Information Security (MOOCs)



**Sixth Semester B.E. – Scheme**

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17IST61	Unix System programming	IS	3:0:0:0	3	100
2	17ISI62	Android Programming (IC)	IS	3:0:2:0	4	100
3	17IST63	Embedded System	IS	3:0:0:0	3	100
4	17ISI64X	Foundation Elective-VI (IC)	IS	3:0:2:0	4	100
5	17IST65X	Engineering Elective-VII	IS	3:0:0:0	3	100
6	17HOE66X	Open Elective-VIII	IS/BS&H	2:0:0:4	3	100
7	17ISL67	Unix System programming Laboratory	IS	1:0:2:0	2	100
8	17ISH68	Technical Aptitude and GD	IS/BS&H	2:0:0:0	2	100
9	17ISP69	Mini project and Seminar	IS	2:0:0:0	2	100
<b>Total</b>				<b>22:0:6:4</b>	<b>26</b>	<b>900</b>

**Foundation Elective-VI (IC)**

Sl. No.	Course Code	Course
1	17ISI641	Distributed Computing System
2	17ISI642	Database Concepts
3	17ISI643	Computer Graphics and Multimedia

**Engineering Elective-VII /PBL**

Sl. No.	Course Code	Course
1	17IST651	Data Mining
2	17IST652	Artificial Intelligence
3	17IST653	Introduction to CSS3 (MOOCS)

**Open Elective-VIII**

Sl. No.	Course Code	Course
1	17HOE661	Lab View – Level 1
2	17HOE662	Yoga and Meditation
3	17HOE663	Martial Arts
4	17HOE664	Music (Carnatic Vocal / Instrumental)
5	17HOE665	Dance
6	17HOE666	Sports
7	17HOE667	Online Certification Courses from IITs / IISc / SWAYAM / EDX



### Seventh Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17IST71	Internet of Things	IS	3:0:0:0	3	100
2	17IST72	Image Processing	IS	3:0:0:0	3	100
3	17ISI73X	Foundation Elective-IX (IC)	IS	3:0:2:0	4	100
4	17IST74X	Engineering Elective-X	IS	3:0:0:0	3	100
5	17HOE75X	Open Elective-XI	IS/BS&H/ME	2:0:0:4	3	100
6	17HOE76X	Open Elective-XII	IS/BS&H	2:0:0:4	3	100
7	17ISL77	Internet of Things Laboratory	IS	1:0:2:0	2	100
8	17ISL78	Image processing Laboratory	IS	1:0:2:0	2	100
9	17ISP79	Project Phase-I and Seminar	IS	0:0:6:0	3	100
		<b>Total</b>		<b>18:0:12:8</b>	<b>26</b>	<b>900</b>

#### Foundation Elective-IX (IC)

Sl. No.	Course Code	Course
1	17ISI731	Soft Computing
2	17ISI732	Big Data
3	17ISI733	Web Technologies – Servlet, JSP

#### Engineering Elective-X / PBL

Sl. No.	Course Code	Course
1	17IST741	System Modeling and Simulation
2	17IST742	Machine Learning (NPTEL/MOOCs)
4	17IST743	Project Planning and Control (MOOCs)

#### Open Elective-XI

Sl. No.	Course Code	Course
1	17HOE751	Tax Management
2	17HOE752	Assessment of Building Energy Performance (Offered by ASHRAE)
3	17HOE753	National Disaster Management and Mitigation
4	17HOE754	Online certification courses from IITs/IISc/SWAYAM/EDX

#### Open Elective-XII

Sl. No.	Course Code	Course
1	17HOE761	Small and Medium Enterprise Management
2	17HOE762	Occupational Safety and Health Administration
3	17HOE763	Animation and Multimedia Engineering
4	17HOE764	Online certification courses from IITs / IISc / SWAYAM / EDX

**Eighth Semester B.E. – Scheme**

Sl. No.	Course Code	Course Name	Teaching Dept.	Total Credits	Marks
1	17ISP81	Project Phase-II	IS	4	100
2	17ISP82	Project Phase-III	IS	4	100
3	17ISP83	Evaluation and Viva-voce (External)	IS	10	100
		<b>Total</b>		<b>18</b>	<b>300</b>

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study



**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System CBCS**

***Outcome Based Education Curriculum***

**2017-2018**

Department of Information Science and Engineering

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, Venkatagirikote Post, Devanahalli taluk,  
Bangalore district - 562 164



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*An Autonomous College under VTU*

**VISION**

Leadership and Excellence in Education.

**MISSION**

To fulfill the vision by imparting total quality education replete with the philosophy of blending human values and academic professionalism.

***DEPARTMENT OF INFORMATION SCIENCE  
& ENGINEERING***

**III & IV Semesters**

***Scheme and Syllabus  
with effect from Academic Year  
2017 - 18***

## **PROGRAM EDUCATIONAL OBJECTIVES (PEOs)**

The graduates of Information Science and Engineering are expected to fulfill the following PEOs after a few years of their graduation.

**PEO1:** Pursue a successful career in the field of Information Science & Engineering or a related field utilizing his/her education and contribute to the profession as an excellent employee, or as an entrepreneur.

**PEO2:** Be able to work effectively in multidisciplinary environments and be responsible members/leaders of their communities

**PEO3:** The graduates of Information Science and Engineering Program should be able to establish an understanding of professionalism, teamwork, ethics, public policy that allows them to become good professional Engineers

**PEO4:** The graduates of Information Science and Engineering Program should be able to provide novel engineering solutions and efficient software designs with legal and ethical responsibility.

**PEO5:** Continuously improve by pursuing advanced degrees in engineering, business, or other professional fields through formal means or through informal self-study.

## **PROGRAM OUTCOMES (POs):**

Graduates of the Information Science and Engineering Programme will be able to achieve the following POs:

### **PO1: Engineering Knowledge:**

Apply the knowledge of mathematics, science, engineering fundamentals, and **Information Science and Engineering** principles to the solution of complex problems in **Information Science and Engineering**.

### **PO2: Problem Analysis:**

Identify, formulate, research literature, and analyze complex **Information Science and Engineering** problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.

### **PO3: Design/Development of Solutions:**

Design solutions for complex **Information Science and Engineering** problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

#### **PO4: Conduct investigations of Complex problems:**

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions related to **Information Science and Engineering** problems.

#### **PO5: Modern Tool Usage:**

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex **Information Science and Engineering** activities with an understanding of the limitations.

#### **PO6: The Engineer and Society:**

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional **Information Science and Engineering** practice.

#### **PO7: Environment and Sustainability:**

Understand the impact of the professional **Information Science and Engineering** solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

#### **PO8: Ethics:**

Apply ethical principles and commit to professional ethics and responsibilities and norms of the **Information Science and Engineering** practice.

#### **PO9: Individual and Team work:**

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

#### **PO10: Communication:**

Communicate effectively on complex **Information Science and Engineering** activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

#### **PO11: Project Management and Finance:**

Demonstrate knowledge and understanding of ~~the~~ engineering and management principles and apply these to one's own work, as a member and leader in a team, to

manage **Information Science and Engineering** projects and in multidisciplinary environments.

**PO12: Life Long Learning:**

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**PROGRAM SPECIFIC OUTCOMES (PSOs):**

Program Specific Outcomes (PSOs) are what the graduates of a specific undergraduate engineering program should be able to do at the time of graduation.

**PSO1: Professional Skills:**

The ability to understand, analyze and develop algorithms and write Information application programs in the areas related to information technology

**PSO2: Problem-Solving Skills:**

Ability to understand the ethics, human values for solving societal problems and environmental protection

**PSO3: Foundation of mathematical concepts:**

Ability to understand the software development skills and practical knowledge for promoting research, higher studies and entrepreneurship.

**Third Semester B.E. – Scheme**

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16ISM31	Engineering Mathematics-III (IC)	Mathematics	3-0-2-0	4	100
2	16IST32	Fundamentals of Computer –n Engineering	ISE	3-0-0-0	3	100
3	16ISI33	Data Structures with C (IC)	ISE	3-0-2-4	5	100
4	16IST34	Analog and Digital Electronics	ISE	3-0-0-0	3	100
5	16IST35	Computer Organization	ISE	3-0-0-0	3	100
6	16ISI36X	Foundation Elective-I (IC)	ISE	2-0-2-0	3	100
7	16ISL37	Analog and Digital Electronics Laboratory	ISE	1-0-2-0	2	100
8	16ISI38	Virtualization Foundations (IC)	ISE	1-0-2-0	2	100
9	16ISH39	Soft Skills Development	ISE	0-2-0-0	1	100
<b>TOTAL</b>				<b>19-2-10-4</b>	<b>26</b>	<b>900</b>

**Foundation Elective-I (IC)**

Sl. No.	Course Code	Course
1	16ISI361	Computer Communication and Networking
2	16ISI362	Creating Interactive and Responsive Web Pages
3	16ISI363	Principles of Programming



**Fourth Semester B.E - Scheme**

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16ISM41	Engineering Mathematics-IV (IC)	Mathematics	3-0-2-0	4	100
2	16IST42	Formal Languages and Automata Theory	ISE	3-0-0-0	3	100
3	16IST43	Design and Analysis of Algorithms	ISE	3-0-0-0	3	100
4	16ISI44	UNIX and Shell Programming (IC)	ISE	3-0-2-0	4	100
5	16ISI45X	Foundation Elective-II (IC)	ISE	3-0-2-0	4	100
6	16IST46X	Engineering Elective-III	ISE	3-0-0-0	3	100
7	16ISL47	Design and Analysis of Algorithms Laboratory	ISE	1-0-2-0	2	100
8	16ISI48	Cloud Computing Foundations (IC)	ISE	1-0-2-0	2	100
9	16ISH49	Soft Skills Development	ISE	0-2-0-0	1	100
<b>TOTAL</b>				<b>20-2-10-0</b>	<b>26</b>	<b>900</b>

**Foundation Elective-II (IC)**

Sl. No.	Course Code	Course
1	16ISI451	Introduction to Microprocessors
2	16ISI452	Object Oriented Programming with C++
3	16ISI453	Introduction to Programming using Python

**Engineering Elective-III**

Sl. No.	Course Code	Course
1	16IST461	Cyber Security
2	16IST462	Renewable Energy Resources
3	16IST463	Smart Materials

C – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study

### Fifth Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	15IST51	Computer Networks	IS	3-0-0-0	3	100
2	15IST52	Microcontrollers	IS	3-0-0-0	3	100
3	15ISI53	Operating System (IC)	IS	3-0-2-0	4	100
4	15IST54	Software Engineering and Testing	IS	3-0-0-0	3	100
5	15ISI55X	Foundation Elective-IV(IC)	IS	3-0-2-0	4	100
6	15IST56X	Engineering Elective-V	IS	3-0-0-0	3	100
7	15ISL57	Computer Networks Laboratory	IS	1-0-2-0	2	100
8	15ISL58	Microcontroller Laboratory	IS	1-0-2-0	2	100
9	15ISH59	General Aptitude	IS/BS&H	2-0-0-0	2	100
<b>TOTAL</b>				<b>22-0-8-0</b>	<b>26</b>	<b>900</b>

### Foundation Elective-IV (IC)

Sl. No.	Course Code	Course
1	15ISI551	Advanced Algorithms
2	15ISI552	Object Oriented Programming with JAVA
3	15ISI553	Compiler Design(NPTEL/MOOCs)

### Engineering Elective-V / PBL

Sl. No.	Course Code	Course
1	15IST561	Operations Research
2	15IST562	Object Oriented Modeling and Design
3	15IST563	Computer Architecture (MOOCs)/ Information Security (MOOCs)

**Sixth Semester B.E. – Scheme**

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	15IST61	Unix System programming	IS	3-0-0-0	3	100
2	15ISI62	Android Programming (IC)	IS	3-0-2-0	4	100
3	15IST63	Embedded System	IS	3-0-0-0	3	100
4	15ISI64X	Foundation Elective-VI (IC)	IS	3-0-2-0	4	100
5	15IST65X	Engineering Elective-VII	IS	3-0-0-0	3	100
6	15HOE66X	Open Elective-VIII	IS/BS&H	2-0-0-4	3	100
7	15ISL67	Unix System programming Laboratory	IS	1-0-2-0	2	100
8	15ISH68	Technical Aptitude and GD	IS/BS&H	2-0-0-0	2	100
9	15ISP69	Mini project and Seminar	IS	2-0-0-0	2	100
<b>Total</b>				<b>22-0-6-4</b>	<b>26</b>	<b>900</b>

**Foundation Elective-VI (IC)**

Sl. No.	Course Code	Course
1	15ISI641	Distributed Computing System
2	15ISI642	Database Concepts
3	15ISI643	Computer Graphics and Multimedia

**Engineering Elective-VII / PBL**

Sl. No.	Course Code	Course
1	15IST651	Data Mining
2	15IST652	Artificial Intelligence
3	15IST653	Introduction to CSS3 (MOOCS)

**Open Elective-VIII**

Sl. No.	Course Code	Course
1	15HOE661	Lab View – Level 1
2	15HOE662	Yoga and Meditation
3	15HOE663	Martial Arts
4	15HOE664	Music (Carnatic Vocal / Instrumental)
5	15HOE665	Dance
6	15HOE666	Sports
7	15HOE667	Online Certification Courses from IITs / IISc / SWAYAM / EDX

### Seventh Semester B.E. – Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	15IST71	Internet of Things	IS	3-0-0-0	3	100
2	15IST72	Image Processing	IS	3-0-0-0	3	100
3	15ISI73X	Foundation Elective-IX (IC)	IS	3-0-2-0	4	100
4	15IST74X	Engineering Elective-X	IS	3-0-0-0	3	100
5	15HOE75X	Open Elective-XI	IS/BS&H/ME	2-0-0-4	3	100
6	15HOE76X	Open Elective-XII	IS/BS&H	2-0-0-4	3	100
7	15ISL77	Internet of Things Laboratory	IS	1-0-2-0	2	100
8	15ISL78	Image processing Laboratory	IS	1-0-2-0	2	100
9	15ISP79	Project Phase-I and Seminar	IS	0-0-6-0	3	100
		<b>Total</b>		<b>18-0-12-8</b>	<b>26</b>	<b>900</b>

#### Foundation Elective-IX (IC)

Sl. No.	Course Code	Course
1	15ISI731	Soft Computing
2	15ISI732	Big Data
3	15ISI733	Web Technologies – Servlet, JSP

#### Engineering Elective-X / PBL

Sl. No.	Course Code	Course
1	15IST741	System Modeling and Simulation
2	15IST742	Machine Learning (NPTEL/MOOCs)
4	15IST743	Project Planning and Control (MOOCs)

#### Open Elective-XI

Sl. No.	Course Code	Course
1	15HOE751	Tax Management
2	15HOE752	Assessment of Building Energy Performance (Offered by ASHRAE)
3	15HOE753	National Disaster Management and Mitigation
4	15HOE754	Online certification courses from IITs/IISc/SWAYAM/EDX

#### Open Elective-XII

Sl. No.	Course Code	Course
1	15HOE761	Small and Medium Enterprise Management
2	15HOE762	Occupational Safety and Health Administration
3	15HOE763	Animation and Multimedia Engineering
4	15HOE764	Online certification courses from IITs / IISc / SWAYAM / EDX

**Eighth Semester B.E. – Scheme**

Sl. No.	Course Code	Course Name	Teaching Dept.	Total Credits	Marks
1	15ISP81	Project Phase-II	IS	4	100
2	15ISP82	Project Phase-III	IS	4	100
3	15ISP83	Evaluation and Viva-voce (External)	IS	10	100
		<b>Total</b>		<b>18</b>	<b>300</b>

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study



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**2017-2018**

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**DEPARTMENT OF INFORMATION SCIENCE  
& ENGINEERING**

**III & IV Semesters**

***Scheme and Syllabus***  
***With effect from Academic Year***  
***2015 -16***

## **PROGRAM EDUCATIONAL OBJECTIVES (PEOs)**

The graduates of Information Science and Engineering are expected to fulfill the following PEOs after a few years of their graduation.

**PEO1:** Pursue a successful career in the field of Information Science & Engineering or a related field utilizing his/her education and contribute to the profession as an excellent employee, or as an entrepreneur.

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**PEO4:** The graduates of Information Science and Engineering Program should be able to provide novel engineering solutions and efficient software designs with legal and ethical responsibility.

**PEO5:** Continuously improve by pursuing advanced degrees in engineering, business, or other professional fields through formal means or through informal self-study.

## **PROGRAM OUTCOMES (POs):**

Graduates of the Information Science and Engineering Programme will be able to achieve the following POs:

### **PO1: Engineering Knowledge:**

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### **PO2: Problem Analysis:**

Identify, formulate, research literature, and analyze complex **Information Science and Engineering** problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.

### **PO3: Design/Development of Solutions:**

Design solutions for complex **Information Science and Engineering** problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

### **PO4: Conduct investigations of Complex problems:**

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions related to **Information Science and Engineering** problems.

### **PO5: Modern Tool Usage:**

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex **Information Science and Engineering** activities with an understanding of the limitations.

### **PO6: The Engineer and Society:**

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional **Information Science and Engineering** practice.

### **PO7: Environment and Sustainability:**

Understand the impact of the professional **Information Science and Engineering** solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

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Apply ethical principles and commit to professional ethics and responsibilities and norms of the **Information Science and Engineering** practice.

### **PO9: Individual and Team work:**

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.



**PO10: Communication:**

Communicate effectively on complex **Information Science and Engineering** activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11: Project Management and Finance:**

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage **Information Science and Engineering** projects and in multidisciplinary environments.

**PO12: Life Long Learning:**

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**PROGRAM SPECIFIC OUTCOMES (PSOs):**

Program Specific Outcomes (PSOs) are what the graduates of a specific undergraduate engineering program should be able to do at the time of graduation.

**PSO1: Professional Skills:**

The ability to understand, analyze and develop algorithms and write Information application programs in the areas related to information technology

**PSO2: Problem-Solving Skills:**

Ability to understand the ethics, human values for solving societal problems and environmental protection

**PSO3: Foundation of mathematical concepts:**

Ability to understand the software development skills and practical knowledge for promoting research, higher studies and entrepreneurship.

### Third Semester B.E. - Scheme

Sl. No	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	15ISM31	Engineering Mathematics-III (IC)	Mathematics	3-0-2-0	4	100
2	15IST32	Fundamentals of Computation Engineering	ISE	3-0-0-0	3	100
3	15ISI33	Data Structures with C (IC)	ISE	3-0-2-4	5	100
4	15IST34	Analog and Digital Electronics	ISE	3-0-0-0	3	100
5	15IST35	Computer Organization	ISE	3-0-0-0	3	100
6	15ISI36X	Foundation Elective-I (IC)	ISE	3-0-0-0	3	100
7	15ISL37	Analog and Digital Electronics Laboratory	ISE	2-0-2-0	3	100
8	15ISI38	Virtualization Foundations (IC)	ISE	1-0-2-0	2	100
9	15ISH39	Soft Skills Development	ISE	0-2-0-0	1	100
TOTAL				19-2-10-4	26	900

#### Foundation Elective-I (IC)

Sl. No	Course Code	Course
1	15ISI361	Computer Communication and Networking
2	15ISI362	Creating Interactive and Responsive Web Pages
3	15ISI363	Principles of Programming

### Fourth Semester B.E - Scheme

Sl. No	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	15ISM41	Engineering Mathematics-IV (IC)	Mathematics	3-0-2-0	4	100
2	15IST42	Formal Languages and Automata Theory	ISE	3-0-0-0	3	100
3	15IST43	Design and Analysis of Algorithms	ISE	3-0-0-0	3	100
4	15ISI44	UNIX and Shell Programming (IC)	ISE	3-0-2-0	4	100

5	15ISI45X	Foundation Elective-II (IC)	ISE	3-0-2-0	4	100
6	15IST46X	Engineering Elective-III	ISE	3-0-0-0	3	100
7	15ISL47	Design and Analysis of Algorithms Laboratory	ISE	1-0-2-0	2	100
8	15ISI48	Cloud Computing Foundations (IC)	ISE	1-0-2-0	2	100
9	15ISH49	Soft Skills Development	ISE	0-2-0-0	1	100
TOTAL				20-2-10-0	26	900

#### Foundation Elective-II (IC)

Sl. No	Course Code	Course
1	15ISI451	Introduction to Microprocessors
2	15ISI452	Object Oriented Programming with C++
3	15ISI453	Introduction to Programming using Python

#### Engineering Elective-III

Sl. No	Course Code	Course
1	15IST461	Cyber Security
2	15IST462	Renewable Energy Resources
3	15IST463	Smart Materials

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study



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***2019-2020***

Department of Mechanical Engineering

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, VenkatagiriKote Post, Devanahalli taluk,  
Bangalore district - 562 164



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**DEPARTMENT OF MECHANICAL ENGINEERING**

**VISION**

To train the students as professionals in Mechanical Engineering blended with leadership qualities to achieve excellence in the challenging future.

**MISSION**

- M1:** Maintaining excellence in Mechanical Engineering education through academic professionalism and teaching for the changing needs of the society.
- M2:** Establishing Centre of excellence for research to promote industrial exposure in the area of Mechanical Engineering.
- M3:** Developing communication skill, leadership qualities, team work and skills for continuing education among the students
- M4:** Inculcating ethics, human values and skills for solving societal problems and environmental protection
- M5:** Creating opportunities to the students for experiencing real time problems through project works to enhance employability and entrepreneurship.

**III & VIII Semesters**

***Scheme and Syllabus***

***With effect from Academic Year 2019-20***

**Third Semester B.E. - Scheme**

Sl. No.	Course Code	Course Name	Teaching Dept.	Credits	L:T:P:S (Hrs/week)	Marks
1	19MAT31	Integral Transformation (IC)	BSC	4	3:0:2:0	100
2	19MET32	Measurements and Manufacturing Process	ME	4	4:0:0:0	100
3	19MET33	Mechanics of Materials	ME	3	3:0:0:0	100
4	19MET34	Computer Aided Machine Drawing	ME	3	2:0:2:0	100
5	19MET35X	Professional Elective - I	ME	3	3:0:0:0	100
6	19MEH36	Universal Human Values	HSMC	3	3:0:0:0	100
7	19MEL37	Measurements and Manufacturing Process Laboratory	ME	2	1:0:2:0	100
8	19MEL38	Material Testing Laboratory	ME	2	1:0:2:0	100
9	19MEH39	Placement Training - I	HSMC	2	2:0:0:0	100
<b>Total</b>				<b>25</b>	<b>21:0:8:0</b>	<b>900</b>

**Professional Elective – I**

Sl. No.	Course Code	Course Name	Total Credits	Marks
1	19MET351	Conventional Mobility	3	100
2	19MET352	Engineering Metallurgy	3	100
3	19MET353	Numerical Methods and Probability	3	100



**Fourth Semester B.E. - Scheme**

Sl. No.	Course Code	Course Name	Teaching Dept.	Credits	L:T:P:S (Hrs/week)	Marks
1	19MET41	Thermal Engineering	ME	4	3:0:2:0	100
2	19MET42	Machine Tools and Operations	ME	4	4:0:0:0	100
3	19MEI43	Kinematics of Machines (IC)	ME	4	3:0:2:0	100
4	19MET44 X	Professional Elective - II	ME	3	3:0:0:0	100
5	19MET45 X	Professional Elective - III	ME	3	3:0:0:0	100
6	19MEL46	Machine Shop Laboratory	ME	2	0:0:4:0	100
7	19MEH47	Constitution of India, Professional Ethics and Human Rights	HSMC	1	1:0:0:0	100
8	19MEH48	Environmental Studies	HSMC	1	1:0:0:0	100
9	19MEH49	Aadalitha Kannada and Vyavaharika Kannada	HSMC	1	1:0:0:0	100
10	19MEH40	Placement Training - II	PT	2	2:0:0:0	1000
<b>Total Credits</b>				<b>25</b>	<b>21:0:8:0</b>	<b>1000</b>

**Professional Elective – II**

Sl. No.	Course Code	Course Name	Total Credits	Marks
1	19MET441	Electrical Mobility	3	100
2	19MET442	Advanced Material Science	3	100
3	19MET443	Additive Manufacturing	3	100

**Professional Elective – III**

<b>Sl. No.</b>	<b>Course Code</b>	<b>Course Name</b>	<b>Total Credits</b>	<b>Marks</b>
1	19MET451	Renewable Energy Resources	3	100
2	19MET452	Management Information System	3	100
3	19MET453	Environmental Air Pollution	3	100

**Fifth Semester B.E. - Scheme**

Sl. No.	Course Code	Course Name	Teaching Dept.	Credits	L:T:P:S (Hrs/week)	Marks
1	19MET51	Machine Design	ME	3	3:0:0:0	100
2	19MET52	Dynamics of Machines	ME	3	3:0:0:0	100
3	19MEI53	Artificial Intelligence and Robotics (IC)	ME	4	3:0:2:0	100
4	19MET54	Fluid Mechanics	ME	3	3:0:0:0	100
5	19MET55X	Professional Elective IV	ME	3	3:0:0:0	100
6	19MET56X	Professional Elective V	ME	3	3:0:0:0	100
7	19MEL57	Fluid Machinery Laboratory	ME	2	2:0:0:0	100
8	19MEL58	Energy Conversion Laboratory	ME	2	2:0:0:0	100
9	19MET59	Placement Training III	S&H	2	2:0:0:0	100
<b>Total</b>				25	24:0:2:0	900

**Professional Elective – IV**

Sl. No.	Course Code	Course Name	Total Credits	Marks
1	19MET551	Composites Material Technology	3	100
2	19MET552	Power Plant Engineering	3	100
3	19MET553	Turbo-machines	3	100



**Professional Elective – V**

Sl. No.	Course Code	Course Name	Total Credits	Marks
1	19MET561	Metal Forming Process	3	100
2	19MET562	Mechatronics	3	100
3	19MET563	Basics of Python for Mechanical Engineers	3	100

**Sixth Semester B.E. - Scheme**

Sl. No.	Course Code	Course Name	Teaching Dept.	Credits	L:T:P:S (Hrs/week)	Marks
1	19MET61	Finite Element Methods	ME	4	3:0:0:0	100
2	19MET62	Computer Integrated Manufacturing	ME	3	3:0:0:0	100
3	19MET63	Heat and Mass Transfer	ME	4	3:2:0:0	100
4	19MET64X	Professional Elective VI	ME	3	3:0:0:0	100
5	19MET65X	Industrial Elective I	ME	3	3:0:0:0	100
6	19MET666X	Industrial Elective II	ME	3	3:0:0:0	100
7	19MEL67	Computer Integrated Manufacturing Laboratory	ME	2	2:0:0:0	100
8	19MEL68	Heat and Mass Transfer Laboratory	ME	2	2:0:0:0	100
9	19MET69	Placement IV	HSMC	2	2:0:0:0	100
<b>Total</b>				<b>25</b>	<b>24:2:0:0</b>	<b>900</b>

**Professional Elective – VI**

Sl. No.	Course Code	Course Name	Total Credits	Marks
1	19MET641	Design of Transmission Elements	3	100
2	19MET642	Refrigeration and Air Conditioning	3	100
3	19MET643	Lab View for Industrial Automation	3	100

**Industrial Elective – I**

Sl. No.	Course Code	Course Name	Total Credits	Marks
1	19MET651	Non-Destructive Testing	3	100
2	19MET652	Operations Research	3	100
3	19MET653	Industrial Internet of Things	3	100

**Industrial Elective – II**

Sl. No.	Course Code	Course Name	Total Credits	Marks
1	19MET661	Hydraulic and Pneumatic Systems	3	100
2	19MET662	Design of Jigs and Fixture	3	100
3	19MET663	Software Testing	3	100

Seventh Semester B.E. - Scheme

Sl. No.	Course Code	Course Name	Teaching Dept.	Credits	L:T:P:S (Hrs/week)	Marks
1	19MET71	Mechanical Vibrations and Noise	ME	3	2:2:0:0	100
2	19MET72X	Professional Elective VII	ME	3	2:2:0:0	100
3	19MET73X	Professional Elective VIII	ME	3	3:0:0:0	100
4	19MET74X	Industrial Elective III	ME	3	3:0:0:0	100
5	19MEL75	Computer Aided Modelling and Analysis Laboratory	ME	2	2:0:0:0	100
6	19MEL76	Design Laboratory	ME	2	2:0:0:0	100
7	19MEP77	Project Phase I	ME	2	2:0:0:0	100
<b>Total</b>				<b>18</b>	<b>16:4:0:0</b>	<b>700</b>

Professional Elective – VII

Sl. No.	Course Code	Course Name	Total Credits	Marks
1	19MET721	Small and Medium Enterprises	3	100
2	19MET722	Accountancy and Taxation	3	100
3	19MET723	Assessment of Building Energy Performance	3	100

Professional Elective – VIII

Sl. No.	Course Code	Course Name	Total Credits	Marks
1	19MET731	Finite Element Analysis by using Hyper Mesh	3	100
2	19MET732	Biomass Energy	3	100

		Systems		
3	19MET733	Automotive Electronics	3	100

**Industrial Elective – III**

Sl. No.	Course Code	Course Name	Total Credits	Marks
1	19MET741	Machine Learning for Mechanical Engineers	3	100
2	19MET742	Welding Technology	3	100
3	19MET743	Solar Energy	3	100

**Eighth Semester B E Scheme**

Sl. No.	Course Code	Course Name	Teaching Dept.	Total Credits	Marks
1	19MEP81	Internship	ME	3	100
2	19MEP82	Project Phase II	ME	3	100
3	19MEP83	Project Phase III	ME	4	100
4	19MEP84	Final Viva Voce (External)	ME	8	100
	<b>TOTAL</b>			<b>16</b>	<b>400</b>

IC –Integrated Course

L–Lecture

T-Tutorials

P-Practical S – Self Study

## Program Educational Objectives (PEOs)

The graduates of Mechanical Engineering are expected to fulfill the following PEOs after a few years of their graduation.

PEO1	Graduates in Mechanical Engineering will apply the basic technical knowledge for design and analysis.
PEO2	Graduates in Mechanical Engineering will exhibit creative and innovative skills.
PEO3	Graduates in Mechanical Engineering will demonstrate good communication skills, dynamic leadership qualities with concern for environmental protection.
PEO4	Mechanical Engineering graduates will be capable of pursuing higher studies, take up research and development work blended with ethics and human values.
PEO5	Graduates in Mechanical Engineering will have the ability to become entrepreneurs thereby switching over from responsive engineering to creative engineering.

## Program Outcomes (POs)

PO1	<b>Engineering Knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and Mechanical Engineering principles to the solution of complex problems in Mechanical Engineering.
PO2	<b>Problem Analysis:</b> Identify, formulate, research interpretation, and analyze complex Mechanical Engineering problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.
PO3	<b>Design/Development of solutions:</b> Design solutions for complex Mechanical Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4	<b>Conduct investigations of complex problems:</b> Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions related to Mechanical Engineering problems.
PO5	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering tools such as CAD, CAM, CIM and FEM including prediction and modeling to complex Mechanical Engineering activities with an understanding of the limitations.
PO6	<b>The Engineer and Society:</b> Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Mechanical Engineering practice.
PO7	<b>Environment and Sustainability:</b> Understand the impact of the professional Mechanical Engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the Mechanical engineering practice. .
PO9	<b>Individual and Teamwork:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	<b>Communication:</b> Communicate effectively on complex Mechanical engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	<b>Project management and Finance:</b> Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	<b>Life-long learning:</b> Recognize the need for, and have the preparation and ability to engage in independent and life- long learning in the broadest context of technological change.



**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System CBCS**

***Outcome Based Education Curriculum***

***2018-2019***

Department of Mechanical Engineering

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, Venkatagirikote Post, Devanahalli taluk,  
Bangalore district - 562 164



**NAGARJUNA**

**COLLEGE OF ENGINEERING & TECHNOLOGY**

*An Autonomous College under VTU*

## **DEPARTMENT OF MECHANICAL ENGINEERING**

### **VISION**

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III & VIII Semesters

*Scheme and Syllabus*

*With effect from Academic Year 2018-19*



### Third Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	18MEM31	Engineering Mathematics - III	Mathematics	3-0-2-0	4	100
2	18MET32	Measurements and Manufacturing Process	ME	3-0-0-0	3	100
3	18MET33	Basic Thermodynamics	ME	4-0-0-0	4	100
4	18MEI34	Mechanics of Materials (IC)	ME	3-0-2-0	4	100
5	18MET35	Computer Aided Machine Drawing	ME	1-0-4-0	3	100
6	18MET36X	Foundation Elective-I	ME	3-0-0-0	3	100
7	18MEL37	Manufacturing Process Laboratory	ME	1-0-2-0	2	100
8	18MEL38	Mechanical Measurements and Metrology Laboratory	ME	1-0-2-0	2	100
9	18MEH39	Integrated Rural Development – Part 1	ME	0-2-0-0	1	100
<b>Total</b>				<b>19-2-12-0</b>	<b>26</b>	<b>900</b>

### Foundation Elective-I

Sl. No.	Courses Code	Course
1	18MET361	Automobile Engineering-I
2	18MET362	Engineering Metallurgy
3	18MET363	Industrial Pollution Control

**Fourth Semester B.E. - Scheme**

Sl. No.	Subject Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	18MEM41	Engineering Mathematics- IV (IC)	Mathematics	3-0-2-0	4	100
2	18MET42	Manufacturing Technology	ME	3-0-0-0	3	100
3	18MEI43	Applied Thermodynamics (IC)	ME	3-0-2-0	4	100
4	18MET44	Kinematics of Machines	ME	4-0-0-0	4	100
5	18MET45X	Foundation Elective-II	ME	3-0-0-0	3	100
6	18MET46X	Engineering Elective-I	ME	3-0-0-0	3	100
7	18MEL47	Machine Shop Laboratory	ME	1-0-2-0	2	100
8	18MEL48	Material Testing Laboratory	ME	1-0-2-0	2	100
9	18MEH49	Integrated Rural Development – Part 2	ME	0-2-0-0	1	100
<b>Total</b>				<b>21-2-8-0</b>	<b>26</b>	<b>900</b>

Foundation Elective-II			Engineering Elective-I	
Sl. No.	Course Code	Course	Course Code	Course
1	18MET451	Automobile Engineering– II	18MET461	Renewable Energy Resources
2	18MET452	Advanced Material Science	18MET462	Object Oriented Programming using C++
3	18MET453	Air Pollution and Control	18MET463	Management Information System
4			18MET464	Smart Materials

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/ week)	Total Credits	Marks
1	18MET51	Machine Design-I	ME	3-0-0-0	3	100
2	18MEI52	Dynamics of Machines (IC)	ME	3-0-2-0	4	100
3	18MET53	Artificial Intelligence And Robotics	ME	3-0-0-0	3	100
4	18MEI54	Fluid Mechanics (IC)	ME	3-0-2-0	4	100
5	18MET55X	Foundation Elective-III	ME	3-0-0-0	3	100
6	18MET56X	Engineering Elective-II	ME	3-0-0-0	3	100
7	18MEL57	Energy Conversion Laboratory	ME	1-0-2-0	2	100
8	18MEL58	Robotics Laboratory	ME	1-0-2-0	2	100
9	18MEH59	General Aptitude	ME/ BS&H	2-0-0-0	2	100
<b>Total</b>				<b>22-0-8-0</b>	<b>26</b>	<b>900</b>

### Foundation Elective-III

Sl. No.	Course Code	Course
1	18MET551	Composite Material Technology
2	18MET552	Power Plant Engineering
3	18MET553	HVAC-I

### Engineering Elective-II

Sl. No.	Course Code	Course
1	18MET561	Metal Forming Process
2	18MET562	Mechatronics
3	18MET563	Economics of Engineering

### Sixth Semester B.E. - Scheme

Sl. No	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	18MET61	Machine Design-II	ME	3-0-0-0	3	100
2	18MEI62	Computer Integrated Manufacturing (IC)	ME	3-0-2-0	4	100
3	18MEI63	Finite Element Methods (IC)	ME	3-0-2-0	4	100
4	18MET64X	Foundation Elective-VI	ME	3-0-0-0	3	100
5	18MET65X	Engineering Elective-III PBL	ME	3-0-0-0	3	100
6	18HOE66X	Open Elective-I	ME/ BS&H	2-0-0-4	3	100
7	18MEL67	Fluid Machinery Laboratory	ME	1-0-2-0	2	100
8	18MEP68	Mini Project and Seminar	ME	1-0-2-0	2	100
9	18MEH69	Technical Aptitude and Group Discussion	ME/ BS&H	2-0-0-0	2	100
<b>Total</b>				<b>21-0-8-4</b>	<b>26</b>	<b>900</b>

### Foundation Elective-VI

Sl. No.	Course Code	Course
1	18MET641	Non-Conventional Machining
2	18MET642	Turbo machines
3	18MET643	HVAC-II

### Engineering Elective-III / PBL

Sl. No.	Course Code	Course
1	18MET651	Refrigeration and Air Conditioning
2	18MET652	Operations Research
3	18MET653	Wind Energy Engineering

### Open Elective-I

Sl. No.	Course Code	Course
1	18HOE661	Lab View – Level 1

**Outcome Based Education**  
**Choice Based Credit System**

2	18HOE662	Yoga and Meditation
3	18HOE663	Martial Arts
4	18HOE664	Music (Carnatic Vocal / Instrumental)
5	18HOE665	Dance
6	18HOE666	Sports
7	18HOE667	Online Certification Courses from IITs / IISc / SWAYAM / EDX

**Seventh Semester B.E. - Scheme**

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	18MEI71	Mechanical Vibrations (IC)	ME	3-0-2-0	4	100
2	18MET72	Heat and Mass Transfer	ME	3-0-0-0	3	100
3	18MET73X	Foundation Elective-V	ME	3-0-0-0	3	100
4	18MET74X	Engineering Elective-IV	ME	3-0-0-0	3	100
5	18HOE75X	Open Elective-II	ME/BS&H	2-0-0-4	3	100
6	18HOE76X	Open Elective-III	ME/BS&H	2-0-0-4	3	100
7	18MEL77	Computer Aided Modelling and Analysis Laboratory	ME	1-0-2-0	2	100
8	18MEL78	Heat and Mass Transfer Laboratory	ME	1-0-2-0	2	100
9	18MEP79	Project Phase-I and Seminar	ME	1-0-4-0	3	100
<b>Total</b>				<b>19-0-10-8</b>	<b>26</b>	<b>900</b>

**Foundation Elective-V**

Sl. No.	Subject Code	Course
1	18MET731	Engineering Management & Entrepreneurship
2	18MET732	Hydraulics and Pneumatics
3	18MET733	HVAC-III

**Engineering Elective-IV**

Sl. No.	Subject Code	Course
1	18MET741	Safety, Security & Building Management Systems
2	18MET742	Foundry Technology
3	18MET743	Biomass Energy Systems

### Open Elective-II

Sl. No.	Course Code	Course
1	18HOE751	Tax Management
2	18HOE752	Assessment of Building Energy Performance
3	18HOE753	Natural Disaster Mitigation & Management
4	18HOE754	Online Certification Program – MOOCS/NPTEL/IIT/EDX/ Course Era certification. Equivalent to 36 – 40 hours approved by Department

### Open Elective-III

Sl. No.	Course Code	Course
1	18HOE761	Small and Medium Enterprise Management
2	18HOE762	Occupational Safety & Health Administration
3	18HOE763	Animation & Multimedia Engineering
4	18HOE764	Online Certification Program – MOOCS/NPTEL/IIT/ EDX/Course Era certification. Equivalent to 36 – 40 hours approved by Department

### Eighth Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	Total Credits	Marks
1	18MEP81	Project Phase-II	ME	4	100
2	18MEP82	Project Phase-III	ME	4	100
3	18MEP83	Evaluation and Viva-Voce (External)	ME	10	100
<b>Total</b>				<b>18</b>	<b>300</b>

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study

### Program Educational Objectives (PEOs)

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### Program Outcomes (POs)

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<b>PO4</b>	<b>Conduct investigations of complex problems:</b> Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions related to Mechanical Engineering problems.



PO5	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering tools such as CAD, CAM, CIM and FEM including prediction and modeling to complex Mechanical Engineering activities with an understanding of the limitations.
PO6	<b>The Engineer and Society:</b> Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Mechanical Engineering practice.
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PO11	<b>Project management and Finance:</b> Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
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***Outcome Based Education Curriculum***

***2017-2018***

Department of Mechanical Engineering

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Mudugurki Village, Venkatagirikote Post, Devanahalli taluk,  
Bangalore district - 562 164



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III & VIII Semesters

**Scheme and Syllabus**

**With effect from Academic Year 2017-18**

### Third Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17MEM31	Engineering Mathematics -III	Mathematics	3-0-2-0	4	100
2	17MET32	Measurements and Manufacturing Process	ME	3-0-0-0	3	100
3	17MET33	Basic Thermodynamics	ME	4-0-0-0	4	100
4	17MEI34	Mechanics of Materials (IC)	ME	3-0-2-0	4	100
5	17MET35	Computer Aided Machine Drawing	ME	1-0-4-0	3	100
6	17MET36 X	Foundation Elective-I	ME	3-0-0-0	3	100
7	17MEL37	Manufacturing Process Laboratory	ME	1-0-2-0	2	100
8	17MEL38	Mechanical Measurements and Metrology Laboratory	ME	1-0-2-0	2	100
9	17MEH39	Integrated Rural Development – Part 1	ME	0-2-0-0	1	100
<b>Total</b>				<b>19-2-12-0</b>	<b>26</b>	<b>900</b>

### Foundation Elective-I

Sl. No.	Courses Code	Course
1	17MET361	Automobile Engineering-I
2	17MET362	Engineering Metallurgy
3	17MET363	Industrial Pollution Control

**Fourth Semester B.E. - Scheme**

Sl. No.	Subject Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17MEM41	Engineering Mathematics- IV (IC)	Mathematics	3-0-2-0	4	100
2	17MET42	Manufacturing Technology	ME	3-0-0-0	3	100
3	17MEI43	Applied Thermodynamics (IC)	ME	3-0-2-0	4	100
4	17MET44	Kinematics of Machines	ME	4-0-0-0	4	100
5	17MET45 X	Foundation Elective-II	ME	3-0-0-0	3	100
6	17MET46 X	Engineering Elective-I	ME	3-0-0-0	3	100
7	17MEL47	Machine Shop Laboratory	ME	1-0-2-0	2	100
8	17MEL48	Material Testing Laboratory	ME	1-0-2-0	2	100
9	17MEH49	Integrated Rural Development – Part 2	ME	0-2-0-0	1	100
<b>Total</b>				<b>21-2-8-0</b>	<b>26</b>	<b>900</b>

Foundation Elective-II			Engineering Elective-I	
Sl. No.	Course Code	Course	Course Code	Course
1	17MET451	Automobile Engineering-II	17MET461	Renewable Energy Resources
2	17MET452	Advanced Material Science	17MET462	Object Oriented Programming using C++
3	17MET453	Air Pollution and Control	17MET463	Management Information System
4			17MET464	Smart Materials

**Fifth Semester B.E. - Scheme**

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17MET51	Machine Design-I	ME	3-0-0-0	3	100
2	17MEI52	Dynamics of Machines (IC)	ME	3-0-2-0	4	100
3	17MET53	Artificial Intelligence And Robotics	ME	3-0-0-0	3	100
4	17MEI54	Fluid Mechanics (IC)	ME	3-0-2-0	4	100
5	17MET55X	Foundation Elective-III	ME	3-0-0-0	3	100
6	17MET56X	Engineering Elective-II	ME	3-0-0-0	3	100
7	17MEL57	Energy Conversion Laboratory	ME	1-0-2-0	2	100
8	17MEL58	Robotics Laboratory	ME	1-0-2-0	2	100
9	17MEH59	General Aptitude	ME/ BS&H	2-0-0-0	2	100
<b>Total</b>				<b>22-0-8-0</b>	<b>26</b>	<b>900</b>

**Foundation Elective-III**

Sl. No.	Course Code	Course
1	17MET551	Composite Material Technology
2	17MET552	Power Plant Engineering
3	17MET553	HVAC-I

Sl. No.	Course Code	Course
1	17MET561	Metal Forming Process
2	17MET562	Mechatronics
3	17MET563	Economics of Engineering

### Sixth Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17MET61	Machine Design-II	ME	3-0-0-0	3	100
2	17MEI62	Computer Integrated Manufacturing (IC)	ME	3-0-2-0	4	100
3	17MEI63	Finite Element Methods (IC)	ME	3-0-2-0	4	100
4	17MET64X	Foundation Elective-VI	ME	3-0-0-0	3	100
5	17MET65X	Engineering Elective-III PBL	ME	3-0-0-0	3	100
6	17HOE66X	Open Elective-I	ME/BS&H	2-0-0-4	3	100
7	17MEL67	Fluid Machinery Laboratory	ME	1-0-2-0	2	100
8	17MEP68	Mini Project and Seminar	ME	1-0-2-0	2	100
9	17MEH69	Technical Aptitude and Group Discussion	ME/BS&H	2-0-0-0	2	100
<b>Total</b>				<b>21-0-8-4</b>	<b>26</b>	<b>900</b>

### Foundation Elective-VI

Sl. No.	Course Code	Course
1	17MET641	Non-Conventional Machining
2	17MET642	Turbo machines
3	17MET643	HVAC-II

### Engineering Elective-III / PBL

Sl. No.	Course Code	Course
1	17MET651	Refrigeration and Air Conditioning
2	17MET652	Operations Research
3	17MET653	Wind Energy Engineering

### Open Elective–I

Sl. No.	Course Code	Course
1	17HOE661	Lab View – Level 1
2	17HOE662	Yoga and Meditation
3	17HOE663	Martial Arts
4	17HOE664	Music (Carnatic Vocal / Instrumental)
5	17HOE665	Dance
6	17HOE666	Sports
7	17HOE667	Online Certification Courses from IITs / IISc / SWAYAM / EDX



**Seventh Semester B.E. - Scheme**

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17MEI71	Mechanical Vibrations (IC)	ME	3-0-2-0	4	100
2	17MET72	Heat and Mass Transfer	ME	3-0-0-0	3	100
3	17MET73X	Foundation Elective-V	ME	3-0-0-0	3	100
4	17MET74X	Engineering Elective-IV	ME	3-0-0-0	3	100
5	17HOE75X	Open Elective-II	ME/BS&H	2-0-0-4	3	100
6	17HOE76X	Open Elective-III	ME/BS&H	2-0-0-4	3	100
7	17MEL77	Computer Aided Modelling and Analysis Laboratory	ME	1-0-2-0	2	100
8	17MEL78	Heat and Mass Transfer Laboratory	ME	1-0-2-0	2	100
9	17MEP79	Project Phase-I and Seminar	ME	1-0-4-0	3	100
<b>Total</b>				<b>19-0-10-8</b>	<b>26</b>	<b>900</b>

**Foundation Elective-V**

Sl. No.	Subject Code	Course
1	17MET731	Engineering Management & Entrepreneurship
2	17MET732	Hydraulics and Pneumatics
3	17MET733	HVAC-III

**Engineering Elective-IV**

Sl. No.	Subject Code	Course
1	17MET741	Safety, Security & Building Management Systems
2	17MET742	Foundry Technology
3	17MET743	Biomass Energy Systems

### Open Elective-II

Sl. No.	Course Code	Course
1	17HOE751	Tax Management
2	17HOE752	Assessment of Building Energy Performance
3	17HOE753	Natural Disaster Mitigation & Management
4	17HOE754	Online Certification Program – MOOCS/NPTEL/IIT/EDX/ Course Era certification. Equivalent to 36 – 40 hours approved by Department

### Open Elective-III

Sl. No.	Course Code	Course
1	17HOE761	Small and Medium Enterprise Management
2	17HOE762	Occupational Safety & Health Administration
3	17HOE763	Animation & Multimedia Engineering
4	17HOE764	Online Certification Program – MOOCS/NPTEL/IIT/ EDX/Course Era certification. Equivalent to 36 – 40 hours approved by Department

### Eighth Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	Total Credits	Marks
1	17MEP81	Project Phase-II	ME	4	100
2	17MEP82	Project Phase-III	ME	4	100
3	17MEP83	Evaluation and Viva-Voce (External)	ME	10	100
<b>Total</b>				<b>18</b>	<b>300</b>

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study

## Program Educational Objectives (PEOs)

The graduates of Mechanical Engineering are expected to fulfill the following PEOs after a few years of their graduation.

PEO1	Graduates in Mechanical Engineering will apply the basic technical knowledge for design and analysis.
PEO2	Graduates in Mechanical Engineering will exhibit creative and innovative skills.
PEO3	Graduates in Mechanical Engineering will demonstrate good communication skills, dynamic leadership qualities with concern for environmental protection.
PEO4	Mechanical Engineering graduates will be capable of pursuing higher studies, take up research and development work blended with ethics and human values.
PEO5	Graduates in Mechanical Engineering will have the ability to become entrepreneurs thereby switching over from responsive engineering to creative engineering.

## Program Outcomes (POs)

PO1	<b>Engineering Knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and Mechanical Engineering principles to the solution of complex problems in Mechanical Engineering.
PO2	<b>Problem Analysis:</b> Identify, formulate, research interpretation, and analyze complex Mechanical Engineering problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.
PO3	<b>Design/Development of solutions:</b> Design solutions for complex Mechanical Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	<b>Conduct investigations of complex problems:</b> Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information

	to provide valid conclusions related to Mechanical Engineering problems.
PO5	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, re- sources, and modern engineering tools such as CAD, CAM, CIM and FEM including prediction and modeling to complex Mechanical Engineering activities with an understanding of the limitations.
PO6	<b>The Engineer and Society:</b> Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Mechanical Engineering practice.
PO7	<b>Environment and Sustainability:</b> Understand the impact of the professional Mechanical Engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and re-possibilities and norms of the Mechanical engineering practice. .
PO9	<b>Individual and Teamwork:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	<b>Communication:</b> Communicate effectively on complex Mechanical engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	<b>Project management and Finance:</b> Demonstrate knowledge and under- standing of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	<b>Life-long learning:</b> Recognize the need for, and have the preparation and ability to engage in independent and life- long learning in the broadest con- text of technological change.



**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System CBCS**

***Outcome Based Education Curriculum***

**2016-2017**

Department of Mechanical Engineering

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, VenkatagiriKote Post, Devanahalli taluk,  
Bangalore district - 562 164

  
**PRINCIPAL**  
Nagarjuna College of Engineering & Technology  
Devanahalli (Tq) Bengaluru (Dt.)-Pin: 562164



**NAGARJUNA**

**COLLEGE OF ENGINEERING & TECHNOLOGY**

*An Autonomous College under VTU*

## **DEPARTMENT OF MECHANICAL ENGINEERING**

### **VISION**

To train the students as professionals in Mechanical Engineering blended with leadership qualities to achieve excellence in the challenging future.

### **MISSION**

- M1:** Maintaining excellence in Mechanical Engineering education through academic professionalism and teaching for the changing needs of the society.
- M2:** Establishing Centre of excellence for research to promote industrial exposure in the area of Mechanical Engineering.
- M3:** Developing communication skill, leadership qualities, team work and skills for continuing education among the students
- M4:** Inculcating ethics, human values and skills for solving societal problems and environmental protection
- M5:** Creating opportunities to the students for experiencing real time problems through project works to enhance employability and entrepreneurship.

***Scheme and Syllabus***

***With effect from Academic Year 2016-17***

### Third Semester B.E. - Scheme

Sl. No.	Course Code	Course Name	Teaching Dept.	Credits	L:T:P:S (Hrs/week)	Marks
1.	16MEM31	Integral Transforms & Calculus of Variations (IC)	Maths	4	3:0:2:0	100
2	16MET32	Measurements and Manufacturing Process	ME	4	4:0:0:0	100
3	16MEI33	Mechanics of Materials (IC)	ME	4	3:0:2:0	100
4	16MET34	Computer Aided Machine Drawing	ME	4	2-0-4-0	100
5	16MET35 X	Foundation Elective - I	ME	4	4:0:0:0	100
6	16MEL36	Measurements and Manufacturing Process Laboratory	ME	2	1:0:2:0	100
7	16MEH37	Technical Report Writing & IRDP	H&S	2	1:2:0:0	100
8	16KAK38 / 16KAK38	Vyavaharika Kannada / Adalitha Kannada	H&S	1	1:0:0:0	100
<b>Total</b>				<b>25</b>	<b>19:2:10:0</b>	<b>800</b>

### Foundation Elective - I

Sl. No.	Course Code	Course Name	Total Credits	Marks
1	16MET351	Automotive Mobility	4	100
2	16MET352	Engineering Metallurgy	4	100
3	16MET353	Numerical Methods and Probability (IC)	4	100

### Fourth Semester B.E. - Scheme

Sl. No.	Course Code	Course Name	Teaching Dept.	Credits	L:T:P:S (Hrs/week)	Marks
1	16MEI41	Thermal Engineering (IC)	ME	4	3:0:2:0	100
2	16MET42	Machine Tools and Operations	ME	4	4:0:0:0	100
3	16MEI43	Kinematics of Machines (IC)	ME	4	3:0:2:0	100
4	16MET44 X	Foundation Elective - II	ME	4	4:0:0:0	100
5	16MET45 X	Engineering Elective - III	ME	4	4:0:0:0	100
6	16MEL4 6	Machine Shop Laboratory	ME	2	1:0:2:0	100
7	16MEH4 7	Career Skill Development Programme	ME	2	1:2:0:0	100
8	16CPH4 8	Constitution of India, Professional Ethics and Human Rights	H&S	1	1:0:0:0	100
<b>Total</b>				<b>25</b>	<b>21:2:6:0</b>	<b>800</b>

### Foundation Elective - II

Sl. No.	Course Code	Course Name	Total Credits	Marks
1	16MET441	Electrical Mobility	4	100
2	16MET442	Advanced Material Science	4	100
3	16MET443	Additive Manufacturing	4	100

### Engineering Elective – III

Sl. No.	Course Code	Course Name
1	16EET451	Renewable Energy Resources
2	16EET452	Introduction to Cyber Security and Cyber Laws
3	16EET453	Management Information System
4	16EET454	Environmental Air Pollution



### Fifth Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16MET51	Machine Design-I	ME	3-0-0-0	3	100
2	16MEI52	Dynamics of Machines (IC)	ME	3-0-2-0	4	100
3	16MET53	Artificial Intelligence And Robotics	ME	3-0-0-0	3	100
4	16MEI54	Fluid Mechanics (IC)	ME	3-0-2-0	4	100
5	16MET55X	Foundation Elective-IV	ME	3-0-0-0	3	100
6	16MET56X	Engineering Elective-V	ME	3-0-0-0	3	100
7	16MEL57	Energy Conversion Laboratory	ME	1-0-2-0	2	100
8	16MEL58	Robotics Laboratory	ME	1-0-2-0	2	100
9	16MEH59	General Aptitude	ME/BS&H	2-0-0-0	2	100
<b>Total</b>				<b>22-0-8-0</b>	<b>26</b>	<b>900</b>

### Foundation Elective-IV

Sl. No.	Course Code	Course
1	16MET551	Composite Material Technology
2	16MET552	Power Plant Engineering
3	16MET553	HVAC-I

### Engineering Elective-V / PBL

Sl. No.	Course Code	Course
1	16MET561	Metal Forming Process
2	16MET562	Mechatronics
3	16MET563	Economics of Engineering

### Sixth Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16MET61	Machine Design-II	ME	3-0-0-0	3	100
2	16MEI62	Computer Integrated Manufacturing (IC)	ME	3-0-2-0	4	100
3	16MEI63	Finite Element Methods (IC)	ME	3-0-2-0	4	100
4	16MET64X	Foundation Elective-VI	ME	3-0-0-0	3	100
5	16MET65X	Engineering Elective-VII / PBL	ME	3-0-0-0	3	100
6	16HOE66X	Open Elective-VIII	ME/BS&H	2-0-0-4	3	100
7	16MEL67	Fluid Machinery Laboratory	ME	1-0-2-0	2	100
8	16MEP68	Mini Project and Seminar	ME	1-0-2-0	2	100
9	16MEH69	Technical Aptitude and Group Discussion	ME/BS&H	2-0-0-0	2	100
<b>Total</b>				<b>21-0-8-4</b>	<b>26</b>	<b>900</b>

### Foundation Elective-VI

Sl. No.	Course Code	Course
1	16MET641	Non-Conventional Machining
2	16MET642	Turbomachines
3	16MET643	HVAC-II

### Engineering Elective-VII / PBL

Sl. No.	Course Code	Course
1	16MET651	Refrigeration and Air Conditioning

2	16MET652	Operations Research
3	16MET653	Wind Energy Engineering

### Open Elective–VIII

Sl. No.	Course Code	Course
1	16HOE661	Lab View – Level 1
2	16HOE662	Yoga and Meditation
3	16HOE663	Martial Arts
4	16HOE664	Music (Carnatic Vocal / Instrumental)
5	16HOE665	Dance
6	16HOE666	Sports
7	16HOE667	Online Certification Courses from IITs / IISc / SWAYAM / EDX

### Seventh Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16MEI71	Mechanical Vibrations (IC)	ME	3-0-2-0	4	100
2	16MET72	Heat and Mass Transfer	ME	3-0-0-0	3	100
3	16MET73X	Foundation Elective-IX	ME	3-0-0-0	3	100
4	16MET74X	Engineering Elective-X	ME	3-0-0-0	3	100
5	16HOE75X	Open Elective-XI	ME/BS&H	2-0-0-4	3	100
6	16HOE76X	Open Elective-XII	ME/BS&H	2-0-0-4	3	100
7	16MEL77	Computer Aided Modelling and Analysis Laboratory	ME	1-0-2-0	2	100
8	16MEL78	Heat and Mass Transfer Laboratory	ME	1-0-2-0	2	100
9	16MEP79	Project Phase-I and Seminar	ME	1-0-4-0	3	100
<b>Total</b>				<b>19-0-10-8</b>	<b>26</b>	<b>900</b>

### Foundation Elective-IX

Sl.	Subject	Course
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No.	Code	Course
1	16MET731	Engineering Management & Entrepreneurship
2	16MET732	Hydraulics and Pneumatics
3	16MET733	HVAC-III

### Engineering Elective-X / PBL

Sl. No.	Subject Code	Course
1	16MET741	Safety, Security & Building Management Systems
2	16MET742	Foundry Technology
3	16MET743	Biomass Energy Systems

### Open Elective-XI

Sl. No.	Course Code	Course
1	16HOE751	Tax Management
2	16HOE752	Assessment of Building Energy Performance
3	16HOE753	Natural Disaster Mitigation & Management
4	16HOE754	Online Certification Program – MOOCS/NPTEL/IIT/EDX/ Course Era certification. Equivalent to 36 – 40 hours approved by Department

### Open Elective-XII

Sl. No.	Course Code	Course
1	16HOE761	Small and Medium Enterprise Management
2	16HOE762	Occupational Safety & Health Administration
3	16HOE763	Animation & Multimedia Engineering
4	16HOE764	Online Certification Program – MOOCS/NPTEL/IIT/ EDX/Course Era certification. Equivalent to 36 – 40 hours approved by Department

### Eighth Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	Total Credits	Marks
1	16MEP81	Project Phase-II	ME	4	100
2	16MEP82	Project Phase-III	ME	4	100
3	16MEP83	Evaluation and Viva-Voce (External)	ME	10	100
<b>Total</b>				<b>18</b>	<b>300</b>

### Program Educational Objectives (PEOs)

The graduates of Mechanical Engineering are expected to fulfill the following PEOs after a few years of their graduation.

<b>PEO 1</b>	Graduates in Mechanical Engineering will apply the basic technical knowledge for design and analysis.
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### Program Outcomes (POs)

PO1	<b>Engineering Knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and Mechanical Engineering principles to the solution of complex problems in Mechanical Engineering.
PO2	<b>Problem Analysis:</b> Identify, formulate, research interpretation, and analyze complex Mechanical Engineering problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.
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PO4	<b>Conduct investigations of complex problems:</b> Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions related to Mechanical Engineering problems.
PO5	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, re- sources, and modern engineering tools such as CAD, CAM, CIM and FEM including prediction and modeling to complex Mechanical Engineering activities with an understanding of the limitations.
PO6	<b>The Engineer and Society:</b> Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Mechanical Engineering practice.
PO7	<b>Environment and Sustainability:</b> Understand the impact of the professional Mechanical Engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
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PO9	<b>Individual and Teamwork:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

<b>PO10</b>	<b>Communication:</b> Communicate effectively on complex Mechanical engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
<b>PO11</b>	<b>Project management and Finance:</b> Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
<b>PO12</b>	<b>Life-long learning:</b> Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System CBCS**

***Outcome Based Education Curriculum***

**2015-2016**

Department of Mechanical Engineering

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, VenkatagiriKote Post, Devanahalli taluk,  
Bangalore district - 562 164

  
**PRINCIPAL**

Nagarjuna College of Engineering & Technology  
Devanahalli (Tq) Bengaluru (Dt.)-Pin: 562164





**NAGARJUNA**

**COLLEGE OF ENGINEERING & TECHNOLOGY**

*An Autonomous College under VTU*

## **DEPARTMENT OF MECHANICAL ENGINEERING**

### **VISION**

To train the students as professionals in Mechanical Engineering blended with leadership qualities to achieve excellence in the challenging future.

### **MISSION**

- M1:** Maintaining excellence in Mechanical Engineering education through academic professionalism and teaching for the changing needs of the society.
- M2:** Establishing Centre of excellence for research to promote industrial exposure in the area of Mechanical Engineering.
- M3:** Developing communication skill, leadership qualities, team work and skills for continuing education among the students
- M4:** Inculcating ethics, human values and skills for solving societal problems and environmental protection
- M5:** Creating opportunities to the students for experiencing real time problems through project works to enhance employability and entrepreneurship.

### ***Scheme and Syllabus***

***With effect from Academic Year 2015-16***

Third Semester B.E. - Scheme

Sl. No.	Course Code	Course Name	Teaching Dept.	Credits	L:T:P:S (Hrs/week)	Marks
1.	15MEM31	Integral Transforms & Calculus of Variations (IC)	Maths	4	3:0:2:0	100
2	15MET32	Measurements and Manufacturing Process	ME	4	4:0:0:0	100
3	15MEI33	Mechanics of Materials (IC)	ME	4	3:0:2:0	100
4	15MET34	Computer Aided Machine Drawing	ME	4	2-0-4-0	100
5	15MET35 X	Foundation Elective - I	ME	4	4:0:0:0	100
6	15MEL36	Measurements and Manufacturing Process Laboratory	ME	2	1:0:2:0	100
7	15MEH37	Technical Report Writing & IRDP	H&S	2	1:2:0:0	100
8	15KAK38 / 15KAK38	Vyavaharika Kannada / Adalitha Kannada	H&S	1	1:0:0:0	100
<b>Total</b>				<b>25</b>	<b>19:2:10:0</b>	<b>800</b>

Foundation Elective - I

Sl. No.	Course Code	Course Name	Total Credits	Marks
1	15MET351	Automotive Mobility	4	100
2	15MET352	Engineering Metallurgy	4	100
3	15MET353	Numerical Methods and Probability (IC)	4	100

Fourth Semester B.E. - Scheme

Sl. No.	Course Code	Course Name	Teaching Dept.	Credits	L:T:P:S (Hrs/week)	Marks
1	15MEI41	Thermal Engineering (IC)	ME	4	3:0:2:0	100
2	15MET42	Machine Tools and Operations	ME	4	4:0:0:0	100
3	15MEI43	Kinematics of Machines (IC)	ME	4	3:0:2:0	100
4	15MET44X	Foundation Elective - II	ME	4	4:0:0:0	100
5	15MET45X	Engineering Elective - III	ME	4	4:0:0:0	100
6	15MEL46	Machine Shop Laboratory	ME	2	1:0:2:0	100
7	15MEH47	Career Skill Development Programme	ME	2	1:2:0:0	100
8	15CPH48	Constitution of India, Professional Ethics and Human Rights	H&S	1	1:0:0:0	100
<b>Total</b>				<b>25</b>	<b>21:2:6:0</b>	<b>800</b>

Foundation Elective - II

Sl. No.	Course Code	Course Name	Total Credits	Marks
1	15MET441	Electrical Mobility	4	100
2	15MET442	Advanced Material Science	4	100
3	15MET443	Additive Manufacturing	4	100

Engineering Elective – III

Sl. No.	Course Code	Course Name
1	15EET451	Renewable Energy Resources
2	15EET452	Introduction to Cyber Security and Cyber Laws
3	15EET453	Management Information System
4	15EET454	Environmental Air Pollution

### Fifth Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	15MET51	Machine Design-I	ME	3-0-0-0	3	100
2	15MEI52	Dynamics of Machines (IC)	ME	3-0-2-0	4	100
3	15MET53	Artificial Intelligence And Robotics	ME	3-0-0-0	3	100
4	15MEI54	Fluid Mechanics (IC)	ME	3-0-2-0	4	100
5	15MET55X	Foundation Elective-IV	ME	3-0-0-0	3	100
6	15MET56X	Engineering Elective-V	ME	3-0-0-0	3	100
7	15MEL57	Energy Conversion Laboratory	ME	1-0-2-0	2	100
8	15MEL58	Robotics Laboratory	ME	1-0-2-0	2	100
9	15MEH59	General Aptitude	ME/ BS&H	2-0-0-0	2	100
<b>Total</b>				<b>22-0-8-0</b>	<b>26</b>	<b>900</b>

### Foundation Elective-IV

Sl. No.	Course Code	Course
1	15MET551	Composite Material Technology
2	15MET552	Power Plant Engineering
3	15MET553	HVAC-I

### Engineering Elective-V / PBL

Sl. No.	Course Code	Course
1	15MET561	Metal Forming Process
2	15MET562	Mechatronics
3	15MET563	Economics of Engineering

### Sixth Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	15MET61	Machine Design-II	ME	3-0-0-0	3	100
2	15MEI62	Computer Integrated Manufacturing (IC)	ME	3-0-2-0	4	100
3	15MEI63	Finite Element Methods (IC)	ME	3-0-2-0	4	100
4	15MET64X	Foundation Elective-VI	ME	3-0-0-0	3	100
5	15MET65X	Engineering Elective-VII / PBL	ME	3-0-0-0	3	100
6	15HOE66X	Open Elective-VIII	ME/BS&H	2-0-0-4	3	100
7	15MEL67	Fluid Machinery Laboratory	ME	1-0-2-0	2	100
8	15MEP68	Mini Project and Seminar	ME	1-0-2-0	2	100
9	15MEH69	Technical Aptitude and Group Discussion	ME/BS&H	2-0-0-0	2	100
<b>Total</b>				<b>21-0-8-4</b>	<b>26</b>	<b>900</b>

### Foundation Elective-VI

Sl. No.	Course Code	Course
1	15MET641	Non-Conventional Machining
2	15MET642	Turbomachines
3	15MET643	HVAC-II

### Engineering Elective-VII / PBL

Sl. No.	Course Code	Course
1	15MET651	Refrigeration and Air Conditioning

2	15MET652	Operations Research
3	15MET653	Wind Energy Engineering

### Open Elective–VIII

Sl. No.	Course Code	Course
1	15HOE661	Lab View – Level 1
2	15HOE662	Yoga and Meditation
3	15HOE663	Martial Arts
4	15HOE664	Music (Carnatic Vocal / Instrumental)
5	15HOE665	Dance
6	15HOE666	Sports
7	15HOE667	Online Certification Courses from IITs / IISc / SWAYAM / EDX

### Seventh Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks	
1	15MEI71	Mechanical Vibrations (IC)	ME	3-0-2-0	4	100	
2	15MET72	Heat and Mass Transfer	ME	3-0-0-0	3	100	
3	15MET73X	Foundation Elective-IX	ME	3-0-0-0	3	100	
4	15MET74X	Engineering Elective-X	ME	3-0-0-0	3	100	
5	15HOE75X	Open Elective-XI	ME/BS&H	2-0-0-4	3	100	
6	15HOE76X	Open Elective-XII	ME/BS&H	2-0-0-4	3	100	
7	15MEL77	Computer Aided Modelling and Analysis Laboratory	ME	1-0-2-0	2	100	
8	15MEL78	Heat and Mass Transfer Laboratory	ME	1-0-2-0	2	100	
9	15MEP79	Project Phase-I and Seminar	ME	1-0-4-0	3	100	
<b>Total</b>					<b>19-0-10-8</b>	<b>26</b>	<b>900</b>

### Foundation Elective-IX

Sl.	Subject	Course
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No.	Code	Course
1	15MET731	Engineering Management & Entrepreneurship
2	15MET732	Hydraulics and Pneumatics
3	15MET733	HVAC-III

### Engineering Elective-X / PBL

Sl. No.	Subject Code	Course
1	15MET741	Safety, Security & Building Management Systems
2	15MET742	Foundry Technology
3	15MET743	Biomass Energy Systems

### Open Elective-XI

Sl. No.	Course Code	Course
1	15HOE751	Tax Management
2	15HOE752	Assessment of Building Energy Performance
3	15HOE753	Natural Disaster Mitigation & Management
4	15HOE754	Online Certification Program – MOOCS/NPTEL/IIT/EDX/ Course Era certification. Equivalent to 36 – 40 hours approved by Department

### Open Elective-XII

Sl. No.	Course Code	Course
1	15HOE761	Small and Medium Enterprise Management
2	15HOE762	Occupational Safety & Health Administration
3	15HOE763	Animation & Multimedia Engineering
4	15HOE764	Online Certification Program – MOOCS/NPTEL/IIT/ EDX/Course Era certification. Equivalent to 36 – 40 hours approved by Department

### Eighth Semester B.E. - Scheme

Sl. No.	Course Code	Course	Teaching Dept.	Total Credits	Marks
1	15MEP81	Project Phase-II	ME	4	100
2	15MEP82	Project Phase-III	ME	4	100
3	15MEP83	Evaluation and Viva-Voce (External)	ME	10	100
<b>Total</b>				<b>18</b>	<b>300</b>

### Program Educational Objectives (PEOs)

The graduates of Mechanical Engineering are expected to fulfill the following PEOs after a few years of their graduation.

<b>PEO 1</b>	Graduates in Mechanical Engineering will apply the basic technical knowledge for design and analysis.
<b>PEO 2</b>	Graduates in Mechanical Engineering will exhibit creative and innovative skills.
<b>PEO 3</b>	Graduates in Mechanical Engineering will demonstrate good communication skills, dynamic leadership qualities with concern for environmental protection.
<b>PEO 4</b>	Mechanical Engineering graduates will be capable of pursuing higher studies, take up research and development work blended with ethics and human values.
<b>PEO 5</b>	Graduates in Mechanical Engineering will have the ability to become entrepreneurs thereby switching over from responsive engineering to creative engineering.

### Program Outcomes (POs)



PO1	<b>Engineering Knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and Mechanical Engineering principles to the solution of complex problems in Mechanical Engineering.
PO2	<b>Problem Analysis:</b> Identify, formulate, research interpretation, and analyze complex Mechanical Engineering problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.
PO3	<b>Design/Development of solutions:</b> Design solutions for complex Mechanical Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	<b>Conduct investigations of complex problems:</b> Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions related to Mechanical Engineering problems.

PO5	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, re- sources, and modern engineering tools such as CAD, CAM, CIM and FEM including prediction and modelling to complex Mechanical Engineering ac- tivities with an understanding of the limitations.
PO6	<b>The Engineer and Society:</b> Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Mechanical Engineering practice.
PO7	<b>Environment and Sustainability:</b> Understand the impact of the professional Mechanical Engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and re-sponsibilities and norms of the Mechanical engineering practice. .
PO9	<b>Individual and Teamwork:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

<b>PO10</b>	<b>Communication:</b> Communicate effectively on complex Mechanical engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
<b>PO11</b>	<b>Project management and Finance:</b> Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
<b>PO12</b>	<b>Life-long learning:</b> Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

# NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous College under VTU)  
(NAAC Accredited with 'A' Grade, NBA Accredited)



**Choice Based Credit System**

Scheme & Syllabus - M. Tech  
Construction Technology  
Outcome Based Education  
Curriculum  
2019-2020

Department of Civil Engineering  
**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
Mudugurki Village, Venkatagiri Kote Post,  
Devanahalli taluk,  
Bangalore district - 562 164



**An Autonomous College under VTU**

## **DEPARTMENT OF CIVIL ENGINEERING**

### **VISION**

To transform the students as leaders in Civil Engineering to achieve professional excellence in the challenging future.

### **MISSION**

**M1:** To provide the Civil Engineering knowledge and skills for students through an excellent academic environment.

**M2:** Adopting innovative teaching techniques using modern engineering tools for designing, modeling and analyzing the societal and environmental problems.

**M3:** Developing Communication skill, leadership qualities through teamwork and skills for continuing education among the students.

**M4:** To inculcate moral, ethical and professional values among students to serve the society.

**M5:** Validate engineering knowledge through innovative research projects to enhance their employability and entrepreneurship skills.

  
**PRINCIPAL**  
Nagarjuna College of Engineering & Technology  
Devanahalli (Tq) Bengaluru (Dt.)-Pin: 562164

### **Program Educational Objectives (PEOs)**

- **PEO1:** Graduates in Civil Engineering will apply the technical knowledge for sustainable societal growth.
- **PEO2:** Graduates of civil Engineering will demonstrate designing, modeling and analyzing skills.
- **PEO3:** Graduates in Civil Engineering will demonstrate good communication skills, dynamic leadership qualities with concern for environmental protection.
- **PEO4:** Civil Engineering graduates will be capable of pursuing higher studies, take up research and development work blended with ethics and human values.
- **PEO5:** Civil engineering graduates will have the ability to become entrepreneurs thereby switching over from responsive engineering to creative engineering.

### **Program Outcomes (POs)**

- **PO-1:** Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and Civil Engineering principles to the solution of complex problems in Civil Engineering.
- **PO-2:** Problem Analysis: Identify, formulate, research literature and analyze complex Civil Engineering problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.
- **PO-3:** Design/Development of Solutions: Design solutions for complex Civil Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.
- **PO-4:** Conduct Investigations of Complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions related to Civil Engineering problems.
- **PO-5:** Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering tools such as CAD, FEM, GIS, etc. including prediction and modeling to complex Civil Engineering activities with an understanding of the limitations.
- **PO-6:** The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Civil Engineering practice.
- **PO-7:** Environment and Sustainability: Understand the impact of the professional Civil Engineering solutions in societal and environmental contexts and demonstrate the knowledge and the need for sustainable development.
- **PO-8:** Ethics: Apply ethical principles and commit to professional ethics and responsibilities while following the Civil Engineering practice.
- **PO-9:** Individual and Team work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.
- **PO-10:** Communication: Communicate effectively on complex Civil Engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

CCT Scheme and Syllabus 2019-20

- **PO-11:** Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage Civil Engineering projects and in multidisciplinary environments.
- **PO-12:** Life Long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**Program Specific Outcome (PSO)**

- **PSO1:** To carryout surveying, prepare layout plans, maps for structures and alignments for canals and roads.
- **PSO2:** To specify, analyze, design, estimate and supervise construction activities such as, test and evaluate foundations and superstructures for buildings, industries, irrigation and hydraulic structures, highways, railways, airports, docks and harbors.
- **PSO3:** To understand the impact of water, air and noise pollution; the methods of waste collection, disposal and processing; specify, design and analyze water supply system, sewerage and industrial effluent conveying and treatment systems.

### First Semester -Scheme

Sl. No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1	19CCT11	Mechanization in construction	Civil Engg.	4-0-0-0	4	100
2	19CCT12	Advances in construction material	Civil Engg.	4-0-0-0	4	100
3	19CCT13	Construction project management	Civil Engg.	4-0-0-0	4	100
4	19CCT14	Structural Masonry	Civil Engg.	4-0-0-0	4	100
5	19CCT15X	<b>Elective- I</b>	Civil Engg.	4-0-0-0	4	100
6	19CCT16	Material Characterization Laboratory	Civil Engg.	0-0-2-0	1	100
7	19CCT17	Research Methodology & IPR	Civil Engg.	2-0-0-0	2	100
<b>Total</b>				<b>22-0-2-0</b>	<b>23</b>	<b>700</b>

Elective- I		
1	19CCT151	Infrastructure Planning
2	19CCT152	Earthquake resistant structures
3	19CCT153	Building Science

### Second Semester - Scheme

Sl. No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1	19CCT21	Construction quality Assurance and Control	Civil Engg.	4-0-0-0	4	100
2	19CCT22	Construction Economics and Finance	Civil Engg.	4-0-0-0	4	100
3	19CCT23	Construction and Contract Management	Civil Engg.	4-0-0-0	4	100
4	19CCT24x	<b>Elective – 2</b>	Civil Engg.	4-0-0-0	4	100
5	19CCT25X	<b>Elective – 3</b>	Civil Engg.	4-0-0-0	4	100
6	19CCT26	Software application lab	Civil Engg.	0-0-2-0	1	100
7	19CCT27	Seminar	Civil Engg.	0-0-0-4	1	100
<b>Total</b>				<b>20-0-2-4</b>	<b>22</b>	<b>700</b>

Elective – 2		
1	19CCT241	Pre Engineered Construction Technology
2	19CCT242	Advanced Construction Techniques
3	19CCT243	Soil exploration and Ground Improvement techniques
Elective – 3		
1	19CCT251	Pavement design and construction
2	19CCT252	Quantity Surveying & Billing
3	19CCT253	Remedial Engineering

### M.Tech Construction Technology

#### Third Semester- Scheme

Sl. No	Course Code	Course Name	Teaching Department	L-T-P-S (Hrs/week)	Total Credits	Marks
1.	19CCT31	Energy and Buildings	Civil Engg.	4-0-0-0	4	100
2.	19CCT32x	<b>Elective – 4</b>	Civil Engg.	4-0-0-0	4	100
3.	19CCT33x	<b>Elective – 5</b>	Civil Engg.	4-0-0-0	4	100
4.	19CCT34	Dissertation Phase 1 & Seminar	Civil Engg.	0-0-4-4	3	100
5.	19CCT35	Internship/Term paper/Mini project	Civil Engg.	0-0-0-24	6	100
<b>Total</b>				<b>12-0-4-28</b>	<b>21</b>	<b>500</b>

#### Elective – 3

1.	19CCT321	Construction Method Statement Procedures
2.	19CCT322	Building Services and Maintenance
3.	19CCT323	Repair and Rehabilitation of structures

#### Elective – 4

1	19CCT331	Construction and Demolition Waste Management
2	19CCT332	Formwork Design for Structures
3	19CCT333	Disaster Management Techniques

#### Fourth Semester- Scheme

Sl. No	Course Code	Course Name	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1	19CCT41	Dissertation Phase II	Civil Engg.	0-0-14-0	6	100
2	19CCT42	Dissertation Phase III	Civil Engg.	0-0-14-0	6	100
3	19CCT43	Dissertation final Viva Voce	Civil Engg.	0-0-04-0	4	100
<b>Total</b>				<b>0-0-32-0</b>	<b>16</b>	<b>300</b>

  
**PRINCIPAL**  
 Nagarjuna College of Engineering & Technology  
 Devanahalli (Tq) Bengaluru (Dt.)-Pin: 562164



NCET- Scheme and Syllabus 2018-19

# NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous College under VTU)

(NAAC Accredited with 'A' Grade, NBA Accredited)



**Choice Based Credit System**

**Scheme - M. Tech**

**Construction Technology**

**Outcome Based Education Curriculum**

**2018-2019**

Department of Civil Engineering

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, Venkatagiri Kote Post, Devanahalli taluk,

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**An Autonomous College under VTU**

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## NCET- Scheme and Syllabus 2018-19

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- **PO-10:** Communication: Communicate effectively on complex Civil Engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
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- **PSO2:** To specify, analyze, design, estimate and supervise construction activities such as, test and evaluate foundations and superstructures for buildings, industries, irrigation and hydraulic structures, highways, railways, airports, docks and harbors.
- **PSO3:** To understand the impact of water, air and noise pollution; the methods of waste collection, disposal and processing; specify, design and analyze water supply system, sewerage and industrial effluent conveying and treatment systems.

NCET- Scheme and Syllabus 2018-19

**M.Tech Construction Technology**

First Semester -Scheme

No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1.	18CCT11	Mechanization in construction	Civil Engg.	4-0-0-0	4	100
2.	18CCT12	Advances in construction material	Civil Engg.	4-0-0-0	4	100
3.	18CCT13	Construction project management	Civil Engg.	4-0-0-0	4	100
4.	18CCT14	Structural Masonary	Civil Engg.	4-0-0-0	4	100
5.	18CCT15X	<b>Elective- I</b>	Civil Engg.	4-0-0-0	4	100
6.	18CCT16	Material Characterization Laboratory	Civil Engg.	1-0-2-0	2	100
7.	18CCT17	Research Methodology & IPR	Civil Engg.	2-0-0-0	2	100
		<b>Total</b>		23-0-2-0	<b>24</b>	<b>700</b>

**Elective- I**

1.	18CCT151	Infrastructure Planning
2.	18CCT152	Earthquake resistant structures
3.	18CCT153	Building Science

## NCET- Scheme and Syllabus 2018-19

## Second Semester - Scheme

No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1.	18CCT21	Construction quality Assurance and Control	Civil Engg.	4-0-0-0	4	100
2.	18CCT22	Construction Economics and Finance	Civil Engg.	4-0-0-0	4	100
3.	18CCT23	Construction and Contract Management	Civil Engg.	4-0-0-0	4	100
4.	18CCT24x	<b>Elective – 2</b>	Civil Engg.	4-0-0-0	4	100
5.	18CCT25X	<b>Elective – 3</b>	Civil Engg.	4-0-0-0	4	100
6.	18CCT26	Software application lab	Civil Engg.	1-0-2-0	2	100
7.	18CCT27	Seminar-1	Civil Engg.	0-0-0-4	2	100
		<b>Total</b>		21-0-2-4	<b>24</b>	<b>700</b>

**Elective – 2**

8.	18CCT241	Pre Engineered Construction Technology
9.	18CCT242	Advanced Construction Techniques
10.	18CCT243	Soil exploration and Ground Improvement techniques

**Elective – 3**

11.	18CCT251	Online course-1
12.	18CCT252	Quantity Surveying & Billing
13.	18CCT253	Remedial Engineering

## NCET- Scheme and Syllabus 2018-19

## Third Semester- Scheme

Sl. No	Course Code	Course Name	Teaching Department	L-T-P-S (Hrs/week)	Total Credits	Marks
1.	18CCT31	Energy and Buildings	Civil Engg.	4-0-0-0	4	100
2.	18CCT32x	<b>Elective – 4</b>	Civil Engg.	4-0-0-0	4	100
3.	18CCT33x	<b>Elective – 5</b>	Civil Engg.	4-0-0-0	4	100
4.	18CCT34	Dissertation Phase 1 & Seminar	Civil Engg.	0-0-0-4	2	100
5.	18CCT35	Internship/Term paper/Mini project	Civil Engg.	0-0-0-24	6	100
<b>Total</b>				<b>12-0-4-28</b>	<b>21</b>	<b>500</b>

<b>Elective – 3</b>		
1.	18CCT321	Construction Method Statement Procedures
2.	18CCT322	Building Services and Maintenance
3.	18CCT323	Repair and Rehabilitation of structures
<b>Elective – 4</b>		
1	18CCT331	Construction and Demolition Waste Management
2	18CCT332	Formwork Design for Structures
3	18CCT333	Online Course - 3

## Fourth Semester- Scheme

Sl. No	Course Code	Course Name	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1	18CCT41	Dissertation Phase II	Civil Engg.	0-0-0-10	5	50
2	18CCT42	Dissertation Phase III	Civil Engg.	0-0-0-10	5	50
3	18CCT43	Dissertation final Viva Voce	Civil Engg.	0-0-0-10	5	100
4	18CCT44	Project Viva voce	Civil Engg.	0-0-0-10	5	100
<b>Total</b>				<b>0-0-0-40</b>	<b>20</b>	<b>300</b>

# **NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

(An Autonomous College under VTU)  
(NAAC Accredited with 'A' Grade, NBA Accredited)



***Choice Based Credit System CBCS***

Scheme - M. Tech  
Construction Technology

***2016 -2017***

***Outcome Based Education Curriculum***

Department of Civil Engineering  
**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
Mudugurki Village, Venkatagiri Kote Post,  
Devanahalli taluk,  
Bangalore district - 562 164





**An Autonomous College under VTU**

## **DEPARTMENT OF CIVIL ENGINEERING**

### **VISION**

To transform the students as leaders in Civil Engineering to achieve professional excellence in the challenging future.

### **MISSION**

**M1:** To provide the Civil Engineering knowledge and skills for students through an excellent academic environment.

**M2:** Adopting innovative teaching techniques using modern engineering tools for designing, modeling and analyzing the societal and environmental problems.

**M3:** Developing Communication skill, leadership qualities through teamwork and skills for continuing education among the students.

**M4:** To inculcate moral, ethical and professional values among students to serve the society.

**M5:** Validate engineering knowledge through innovative research projects to enhance their employability and entrepreneurship skills.

## **Program Educational Objectives (PEOs)**

- **PEO1:** Graduates in Civil Engineering will apply the technical knowledge for sustainable societal growth.
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**PRINCIPAL**  
Nagarjuna College of Engineering & Technology  
Devanahalli (Tq) Bengaluru (Dt.)-Pin: 562164

## M.Tech Construction Technology

### First Semester -Scheme

Sl. No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1.	15CCT11	Mechanization in construction	Civil Engg.	4-0-0-0	4	100
2.	15CCT12	Advances in construction material	Civil Engg.	4-0-0-0	4	100
3.	15CCT13	Construction project management	Civil Engg.	4-2-0-0	5	100
4.	15CCT14	Structural Masonary	Civil Engg.	4-0-0-0	4	100
5.	15CCT15 X	<b>Elective- I</b>	Civil Engg.	4-0-0-0	4	100
6.	15CCT16	Material Characterization Laboratory	Civil Engg.	1-0-2-0	2	50
7.	15CCT17	Seminar-1	Civil Engg.	0-0-2-4	2	50
		<b>Total</b>		21-2-4-4	<b>25</b>	<b>600</b>

### **Elective- I**

1.	15CCT151	Advanced Design of RC structures
2.	15CCT152	RS and GIS applications in Construction
3.	15CCT153	Building Science

Second Semester - Scheme

Sl. No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1.	15CCT21	Pre Engineered Construction Technology	Civil Engg.	4-0-0-0	4	100
2.	15CCT22	Construction Economics and Finance	Civil Engg.	4-2-0-0	5	100
3.	15CCT23	Construction and Contract Management	Civil Engg.	4-2-0-0	5	100
4.	15CCT24x	<b>Elective – 2</b>	Civil Engg.	4-0-0-0	4	100
5.	15CCT25X	<b>Elective – 3</b>	Civil Engg.	4-0-0-0	4	100
6.	15CCT26	Software application lab	Civil Engg.	1-0-2-0	2	50
7.	15CCT27	Seminar-2	Civil Engg.	0-0-2-4	2	50
		<b>Total</b>		21-4-4-4	<b>26</b>	<b>600</b>

**Elective – 2**

8.	15CCT241	Construction quality and safety
9.	15CCT242	Advanced design of sub structures
10.	15CCT243	Remedial Engineering

**Elective – 3**

11.	15CCT251	Pavement design and construction
12.	15CCT252	Design of earthquake resistance structures
13.	15CCT253	Soil expolaration and ground Improvement techniques

**Third Semester**

Sl. No	Course Code	Course Name	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
14.	15CCT31	Energy and Buildings	Civil Engg.	4-2-0-0	5	100
15.	15CCT32x	<b>Elective – 4</b>	Civil Engg.	4-0-0-0	4	100
16.	15CCT33x	<b>Elective – 5</b>	Civil Engg.	4-2-0-0	5	100
17.	15CCT34	Project Phase– 1	Civil Engg.	-	5	50
18.	15CCT35	Seminar - 3	Civil Engg.	0-0-0-2	1	50
19.	15CCT36	Internship/Term paper/Mini project	Civil Engg.	-	4	50
			<b>Total</b>	12-4-0-2	<b>24</b>	<b>450</b>

**Elective – 3**

1.	15CCT321	Project Safety Management
2.	15CCT322	Building Services and Maintenance
3.	15CCT323	Disaster Management

**Elective – 4**

1.	15CCT331	Construction and Demolition Waste Management
2.	15CCT332	Formwork Design Of Structures
3.	15CCT333	Quantitative methods in construction

## Fourth Semester

Sl. No	Course Code	Course Name	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1	15CCT41	Project Phase– II	Civil Engg.	-	5	50
2	15CCT42	Project Phase– III	Civil Engg.	-	5	50
3	15CCT43	Dissertation Evaluation	Civil Engg.	-	5	100
4	15CCT44	Project Viva voce	Civil Engg.	-	5	100
			<b>Total</b>	-	<b>20</b>	<b>300</b>

**Note:**

3. The Laboratory phases are CIE with report submission and seminar presentation of 50 marks each.
4. The Seminar (I & II semester) on current topics shall be presented along with a report for evaluation.
5. Project work Phase -1, 2& 3 to be awarded by the department committee constituted for the purpose.
6. The project thesis evaluation has to be done separately by internal and external examiners.
5. The project Viva-voce has to be done jointly by the internal and external examiner.

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**Choice Based Credit System**

Scheme-I to IV Semester  
M.Tech (Structural Engineering)  
Outcome Based Education Curriculum

2020-2021

**Department of Civil Engineering**  
**NAGARJUNACOLLEGE OF ENGINEERING & TECHNOLOGY**  
**Mudugurki Village, Venkatagiri Kote**  
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**First Semester M.Tech (Structural Engineering)-Scheme**

Sl. No	Course Code	Course	Teaching Department	L-T-P-S (Hrs/week)	Total Credits	Marks
1	20CSE11	ADVANCED DESIGN OF RCC STRUCTURES	CV	4-0-0-0	4	100
2	20CSE12	MECHANICS OF DEFORMABLE BODIES	CV	4-0-0-0	4	100
3	20CSE13	COMPUTATIONAL STRUCTURAL MECHANICS	CV	4-0-0-0	4	100
4	20CSE14	STRUCTURAL DYNAMICS	CV	4-0-0-0	4	100
5	20CSE15X	ELECTIVE- I	CV	3-0-0-0	3	100
6	20CSE16	STRUCTURAL ENGINEERING LAB-1	CV	0-0-2-0	2	100
7	20CSE17	RESEARCH METHODOLOGY AND IPR	CV	2-0-0-0	2	100
Total				21-0-2-0	23	700

Elective –I		
Sl.No	Course Code	Course
1	20CSE151	ADVANCED DESIGN OF PRE-STRESSED CONCRETE STRUCTURES
2	20CSE152	DESIGN OF PRECAST AND COMPOSITE STRUCTURES
3	20CSE153	REPAIR AND REHABILITATION OF STRUCTURES

IC–Integrated Course	L-Lecture	T-Tutorials	P-Practical	S-Self Study
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### Second Semester M.Tech (Structural Engineering)-Scheme

Sl. No	Course Code	Course	Teaching Department	L-T-P-S (Hrs/week)	Total Credits	Marks
1	20CSE21	ADVANCEDDESIGNOF STEELSTRUCTURES	CE	4-0-0-0	4	100
2	20CSE22	EARTHQUAKERESISTANT DESIGNOFSTRUCTURES	CE	4-0-0-0	4	100
3	20CSE23	FINITE ELEMENT METHODOFANALYSIS	CE	4-0-0-0	4	100
4	20CSE24X	ELECTIVE -II	CE	4-0-0-0	4	100
5	20CSE25X	ELECTIVE-III	CE	4-0-0-0	4	100
6	20CSE26	STRUCTURALENGIN EERINGLAB-2	CE	0-0-2-0	2	100
7	20CSE27	TECHNICALSEMINAR-I	CE	0-0-0-2	1	50
Total				<b>20-0-2-2</b>	<b>23</b>	<b>650</b>

Elective- II		
Sl.No	Course Code	Course
1	20CSE241	ADVANCEDSTRUCTURALANALYSIS
2	20CSE242	DESIGNOFRCBRIDGES
3	20CSE243	OPTIMIZATIONOFSTRUCTURES

Elective-III		
Sl.No	Course Code	Course
1	20CSE251	DESIGNOFTALLSTRUCTURES
2	20CSE252	STRUCTURALHEALTHMONITORING
3	20CSE253	RELIABILITYANALYSIS OFSTRUCTURES

IC-Integrated Course	L-Lecture	T-Tutorials	P-Practical	S-Self Study
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### Third Semester M.Tech (Structural Engineering)-Scheme

Sl. No	Course Code	Course	Teaching Department	L-T-P-S (Hrs/week)	Total Credits	Marks
1	20CSE31	STABILITY OF STRUCTURES	CE	4-0-0-0	4	100
2	20CSE32X	ELECTIVE –IV	CE	4-0-0-0	4	100
3	20CSE33X	ELECTIVE–V	CE	4-0-0-0	4	100
4	20CSE34	DISSERTATION-PHASE 1	CE	0-0-4-4	3	100
5	20CSE35	MINIPROJECT	CE	0-0-2-0	2	100
6	20CSE36	INTERNSHIP	CE	0-0-4-0	4	100
7	20CSE37	TECHNICAL SEMINAR-II	CE	0-0-0-2	1	50
Total				<b>12-0-10-6</b>	<b>22</b>	<b>650</b>

#### Elective– IV

Sl.No	Course Code	Course
1	20CSE321	DESIGN OF SUBSTRUCTURES
2	20CSE322	OFFSHORE STRUCTURES
3	20CSE323	DESIGN OF PLATES AND SHELLS

#### Elective –V

Sl.No	Course Code	Course
1	20CSE331	DESIGN OF COMPOSITE STRUCTURES
2	20CSE332	DESIGN OF MASONRY STRUCTURES
3	20CSE333	FORMWORK DESIGN OF STRUCTURES

IC–Integrated Course	L–Lecture	T–Tutorials	P–Practical	S–Self Study
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### Fourth Semester M.Tech (Structural Engineering)-Scheme

Sl. No	Course Code	Course	Teaching Department	L-T-P-S (Hrs/week)	Total Credits	Marks
1	20CSE41	Project Phase-II	CE	-	5	100
2	20CSE42	Project Phase-III	CE	-	5	100
3	20CSE43	Dissertation Evaluation	CE	-	5	100
4	20CSE44	Project Viva voce	CE	-	5	100
Total				<b>362</b>	<b>20</b>	<b>400</b>

# NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

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***Choice Based Credit System CBCS***

Scheme - M. Tech Structural Engineering

Outcome Based Education  
Curriculum  
2019-2020

Department of Civil Engineering  
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## M.Tech Structural Engineering

### First Semester- Scheme

Sl. No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1.	19CSE11	Advanced Design of RCC Structures	Civil Engineering	4-0-0-0	4	100
2.	19CSE12	Mechanics of Deformable Bodies	Civil Engineering	4-0-0-0	4	100
3.	19CSE13	Computational Structural Mechanics	Civil Engineering.	4-0-0-0	4	100
4.	19CSE14	Structural Dynamics	Civil Engineering	4-0-0-0	4	100
5.	19CSE15X	<b>Elective- I</b>	Civil Engineering	4-0-0-0	4	100
6.	19CSE16	Structural Engg. Lab – 1	Civil Engineering	0-0-2-0	1	100
7.	19CSE17	Research Methodology & IPR	Civil Engineering	2-0-0-0	2	100
<b>Total</b>				<b>22-0-2-0</b>	<b>23</b>	<b>700</b>

<b>Elective- I</b>		
1	19CSE151	Advanced Design of Pre-stressed Concrete Structures
2	19CSE152	Design of Precast & Composite Structures
3	19CSE153	Repair and Rehabilitation of Structures

### Second Semester- Scheme

Sl. No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1.	19CSE21	Advanced Design of Steel Structures	Civil Engineering	4-0-0-0	4	100
2.	19CSE22	Earthquake Resistant Design of Structures	Civil Engineering	4-0-0-0	4	100
3.	19CSE23	Finite Element Methods and Analysis	Civil Engineering	4-0-0-0	4	100
4.	19CSE24x	<b>Elective – 2</b>	Civil Engineering	4-0-0-0	4	100
5.	19CSE25x	<b>Elective – 3</b>	Civil Engineering	4-0-0-0	4	100
6.	19CSE26	Structural Engg. Lab – 2	Civil Engineering	0-0-2-0	1	100
7.	19CSE27	Seminar	Civil Engineering	0-0-0-4	1	100
<b>Total</b>				<b>20-0-2-4</b>	<b>22</b>	<b>700</b>

<b>Elective – 2</b>		
1.	19CSE241	Design concept of Substructures
2.	19CSE242	Design of Concrete Bridges
3.	19CSE243	Optimization of Structures
<b>Elective – 3</b>		
1.	19CSE251	Design of Tall Structures
2.	19CSE252	Structural Health Monitoring
3.	19CSE253	Reliability analysis of Structures

## M.Tech Structural Engineering

### Third Semester- Scheme

Sl. No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1.	19CSE31	Stability of Structures	Civil Engineering	4-0-0-0	4	100
2.	19CSE32x	<b>Elective – 4</b>	Civil Engineering	4-0-0-0	4	100
3.	19CSE33x	<b>Elective – 5</b>	Civil Engineering	4-0-0-0	4	100
4.	19CSE34	Dissertation Phase– 1 & Seminar	Civil Engineering	0-0-4-4	3	100
5.	19CSE35	Internship/Term paper/Mini project	Civil Engineering	0-0-0-24	6	100
<b>Total</b>				<b>12-0-4-28</b>	<b>21</b>	<b>500</b>

<b>Elective – 4</b>		
1.	19CSE321	Design of Floating Structures
2.	19CSE322	Advanced Construction Techniques
3.	19CSE323	Design of Plates and Shells
<b>Elective – 5</b>		
1.	19CSE331	Design of Composite Structures
2.	19CSE332	Design of Masonry Structures
3.	19CSE333	Formwork Design for Structures

### Fourth Semester - Scheme

Sl. No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1	19CSE41	Dissertation Phase II	Civil Engg.	0-0-14-0	06	100
2	19CSE42	Dissertation Phase III	Civil Engg.	0-0-14-0	06	100
3	19CSE43	Dissertation final Viva Voce	Civil Engg.	0-0-4-0	04	100
<b>Total</b>				<b>0-0-32-0</b>	<b>16</b>	<b>300</b>

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**Choice Based Credit System**

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**Outcome Based Education Curriculum**

**2018-2019**

Department of Civil Engineering

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, Venkatagiri Kote Post, Devanahalli taluk,

Bangalore district - 562 164



**An Autonomous College under VTU**

## **DEPARTMENT OF CIVIL ENGINEERING**

### **VISION**

To transform the students as leaders in Civil Engineering to achieve professional excellence in the challenging future.

### **MISSION**

**M1:** To provide the Civil Engineering knowledge and skills for students through an excellent academic environment.

**M2:** Adopting innovative teaching techniques using modern engineering tools for designing, modeling and analyzing the societal and environmental problems.

**M3:** Developing Communication skill, leadership qualities through teamwork and skills for continuing education among the students.

**M4:** To inculcate moral, ethical and professional values among students to serve the society.

**M5:** Validate engineering knowledge through innovative research projects to enhance their employability and entrepreneurship skills.

### **Program Educational Objectives (PEOs)**

- **PEO1:** Graduates in Civil Engineering will apply the technical knowledge for sustainable societal growth.
- **PEO2:** Graduates of civil Engineering will demonstrate designing, modeling and analyzing skills.
- **PEO3:** Graduates in Civil Engineering will demonstrate good communication skills, dynamic leadership qualities with concern for environmental protection.
- **PEO4:** Civil Engineering graduates will be capable of pursuing higher studies, take up research and development work blended with ethics and human values.
- **PEO5:** Civil engineering graduates will have the ability to become entrepreneurs thereby switching over from responsive engineering to creative engineering.

### **Program Outcomes (POs)**

- **PO-1:** Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and Civil Engineering principles to the solution of complex problems in Civil Engineering.
- **PO-2:** Problem Analysis: Identify, formulate, research literature and analyze complex Civil Engineering problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.
- **PO-3:** Design/Development of Solutions: Design solutions for complex Civil Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmental considerations.
- **PO-4:** Conduct Investigations of Complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions related to Civil Engineering problems.
- **PO-5:** Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering tools such as CAD, FEM, GIS, etc. including prediction and modeling to complex Civil Engineering activities with an understanding of the limitations.
- **PO-6:** The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Civil Engineering practice.
- **PO-7:** Environment and Sustainability: Understand the impact of the professional Civil Engineering solutions in societal and environmental contexts and demonstrate the knowledge and the need for sustainable development.

## NCET- Scheme and Syllabus 2018-19

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- **PO-8:** Ethics: Apply ethical principles and commit to professional ethics and responsibilities while following the Civil Engineering practice.
- **PO-9:** Individual and Team work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.
- **PO-10:** Communication: Communicate effectively on complex Civil Engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO-11:** Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage Civil Engineering projects and in multidisciplinary environments.
- **PO-12:** Life Long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### Program Specific Outcome (PSO)

- **PSO1:** To carryout surveying, prepare layout plans, maps for structures and alignments for canals and roads.
- **PSO2:** To specify, analyze, design, estimate and supervise construction activities such as, test and evaluate foundations and superstructures for buildings, industries, irrigation and hydraulic structures, highways, railways, airports, docks and harbors.
- **PSO3:** To understand the impact of water, air and noise pollution; the methods of waste collection, disposal and processing; specify, design and analyze water supply system, sewerage and industrial effluent conveying and treatment systems.



**NCET- Scheme and Syllabus 2018-19**

**M.Tech Structural Engineering**

**Outcome Based Education**  
**Choice Based Credit System CBCS Curricula**

**First Semester**

Sl. No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1.	18CSE11	Advanced Design of RCC Structures	Civil Engg.	4-0-0-0	4	100
2.	18CSE12	Mechanics of Deformable Bodies	Civil Engg.	4-0-0-0	4	100
3.	18CSE13	Computational Structural Mechanics	Civil Engg.	4-0-0-0	4	100
4.	18CSE14	Structural Dynamics	Civil Engg.	4-0-0-0	4	100
5.	18CSE15X	<b>Elective- I</b>	Civil Engg.	4-0-0-0	4	100
6.	18CSE16	Structural Engg. Lab – 1	Civil Engg.	1-0-2-0	2	100
7.	18CSE17	Research Methodology & IPR	Civil Engg.	2-0-0-0	2	100
		<b>Total</b>		<b>23-0-2-0</b>	<b>24</b>	<b>700</b>

**Elective- I**

1.	18CSE151	Advanced Design of Pre-stressed Concrete Structures
2.	18CSE152	Design of Precast & Composite Structures
3.	18CSE153	Repair and Rehabilitation of Structures

## NCET- Scheme and Syllabus 2018-19

### Second Semester

**Outcome Based Education**  
**Choice Based Credit System CBCS Curricula**

Sl. No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1.	18CSE21	Advanced Design of Steel Structures	Civil Engg.	4-0-0-0	4	100
2.	18CSE22	Earthquake Resistant Structures	Civil Engg.	4-0-0-0	4	100
3.	18CSE23	Finite Element Methods and Analysis	Civil Engg.	4-0-0-0	4	100
4.	18CSE24x	<b>Elective – 2</b>	Civil Engg.	4-0-0-0	4	100
5.	18CSE25x	<b>Elective – 3</b>	Civil Engg.	4-0-0-0	4	100
6.	18CSE26	Structural Engg. Lab – 2	Civil Engg.	1-0-2-0	2	100
7.	18CSE27	Seminar	Civil Engg.	0-0-0-4	2	100
<b>Total</b>				21-0-2-4	<b>24</b>	<b>700</b>

#### **Elective – 2**

1.	18CSE241	Design concept of Substructures
2.	18CSE242	Design of Concrete Bridges
3.	18CSE243	Online Course -1

#### **Elective – 3**

1.	18CSE251	Design of Tall Structures
2.	18CSE252	Structural Health Monitoring
3.	18CSE253	Reliability analysis of Structures

## NCET- Scheme and Syllabus 2018-19

### Third Semester

**Outcome Based Education**  
**Choice Based Credit System CBCS Curricula**

Sl. No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1.	18CSE31	Stability of Structures	Civil Engg.	4-0-0-0	4	100
2.	18CSE32x	<b>Elective – 4</b>	Civil Engg.	4-0-0-0	4	100
3.	18CSE33x	<b>Elective – 5</b>	Civil Engg.	4-0-0-0	4	100
4.	18CSE34	Project Phase – 1	Civil Engg.	0-0-0-4	2	100
5.	18CSE35	Internship/Term paper/Mini project	Civil Engg.	0-0-0-12	6	100
			<b>Total</b>	12-0-0-16	<b>20</b>	<b>500</b>

#### Elective – 2

1.	18CSE321	Design of Floating Structures
2.	18CSE322	Online Course -2
3.	18CSE323	Design of Plates and Shells

#### Elective – 3

1.	18CSE331	Online Course - 3
2.	18CSE332	Design of Masonry Structures
3.	18CSE333	Formwork Design for Structures

### Fourth Semester

Sl. No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1.	18CSE41	Project Phase – II	Civil Engg.	0-0-0-10	5	50
2.	18CSE42	Project Phase – III	Civil Engg.	0-0-0-10	5	50
3.	18CSE43	Dissertation Evaluation	Civil Engg.	0-0-0-10	5	100
4.	18CSE44	Project Viva voce	Civil Engg.	0-0-0-10	5	100
			<b>Total</b>	0-0-0-40	<b>20</b>	<b>300</b>

# **NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

(An Autonomous College under VTU)  
(NAAC Accredited with 'A' Grade, NBA Accredited)



**Choice Based Credit System (CBCS)**

Scheme - M. Tech  
Structural Engineering

**2016 -2017**

***Outcome Based Education Curriculum***

Department of Civil Engineering  
**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  
Mudugurki Village, Venkatagiri Kote Post,  
Devanahalli taluk,  
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**M.Tech Structural Engineering**

First Semester

Sl. No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1.	15CSE11	Advanced Design of RC Structures	Civil Engg.	4-0-0-0	4	100
2.	15CSE12	Mechanics of Deformable Bodies	Civil Engg.	4-0-0-0	4	100
3.	15CSE13	Computational Structural Mechanics	Civil Engg.	4-0-0-0	4	100
4.	15CSE14	Structural Dynamics	Civil Engg.	4-2-0-0	5	100
5.	15CSE15X	<b>Elective- I</b>	Civil Engg.	4-0-0-0	4	100
6.	15CSE16	Structural Engg. Lab – 1	Civil Engg.	1-0-2-0	2	50
7.	15CSE17	Seminar - 1	Civil Engg.	0-0-2-4	2	50
		<b>Total</b>		<b>21-2-4-4</b>	<b>25</b>	<b>600</b>

**Elective- I**

1	15CSE151	Special Concrete
2	15CSE152	Design of Industrial Structures
3	15CSE153	Repair and Rehabilitation of Structures



Second Semester

Sl. No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1.	15CSE21	Design of Plates and shells	Civil Engg.	4-2-0-0	5	100
2.	15CSE22	Earthquake Resistant Structures	Civil Engg.	4-0-0-0	4	100
3.	15CSE23	Finite Element Methods and Analysis	Civil Engg.	4-2-0-0	5	100
4.	15CSE24x	<b>Elective – 2</b>	Civil Engg.	4-0-0-0	4	100
5.	15CSE25x	<b>Elective – 3</b>	Civil Engg.	4-0-0-0	4	100
6.	15CSE26	Structural Engg. Lab – 2	Civil Engg.	1-0-2-0	2	50
7.	15CSE27	Seminar - 2	Civil Engg.	0-0-2-4	2	50
			<b>Total</b>	21-4-4-4	<b>26</b>	<b>600</b>

**Elective – 2**

1.	15CSE241	Design concept of Substructures
2.	15CSE242	AI and Expert system in structural Engg.
3.	15CSE243	Reliability analysis of Structures

**Elective – 3**

1.	15CSE251	Design of Tall Structures
2.	15CSE252	Composite and Smart Materials
3.	15CSE253	Design of Concrete Bridges

**M.Tech Structural Engineering**

**Third Semester**

Sl. No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
8.	15CSE31	Stability of Structures	Civil Engg.	4-2-0-0	5	100
9.	15CSE32x	<b>Elective – 4</b>	Civil Engg.	4-0-0-0	4	100
10.	15CSE33x	<b>Elective – 5</b>	Civil Engg.	4-2-0-0	5	100
11.	15CSE34	Project Phase– 1	Civil Engg.	-	5	50
12.	15CSE35	Seminar - 3	Civil Engg.	0-0-0-2	1	50
13.	15CSE36	Internship/Term paper/Mini project	Civil Engg.	-	4	50
			<b>Total</b>	12-4-0-2	<b>24</b>	<b>450</b>

**Elective – 3**

4.	15CSE321	Construction Materials, Methods and Equipments
5.	15CSE322	Industrial Steel Structures
6.	15CSE323	Advanced Construction Techniques

**Elective – 4**

4.	15CSE331	Optimization Technique
5.	15CSE332	Masonry Structures
6.	15CSE333	Formwork Design Of Structures

**Outcome Based Education**  
**Choice Based Credit System**  
**Curricula**

**Fourth Semester**

Sl. No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1	15CSE41	Project Phase– II	Civil Engg.	-	5	50
2	15CSE42	Project Phase– III	Civil Engg.	-	5	50
3	15CSE43	Dissertation Evaluation	Civil Engg.	-	5	100
4	15CSE44	Project Viva voce	Civil Engg.	-	5	100
			<b>Total</b>	-	<b>20</b>	<b>300</b>

**Note:**

1. The Laboratory phases are CIE with report submission and seminar presentation of 50 marks each.
2. The Seminar (I & II semester) on current topics shall be presented along with a report for evaluation.
3. Project work Phase -1, 2& 3 to be awarded by the department committee constituted for the purpose.
4. The project thesis evaluation has to be done separately by internal and external examiners.
5. The project Viva-voce has to be done jointly by the internal and external examiner.



**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System CBCS**

***Outcome Based Education Curriculum***

***2015-2017***

**DEPARTMENT  
OF  
MASTER OF BUSINESS ADMINISTRATION**

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, Venkatagirikote Post, Devanahalli taluk,  
Bangalore district - 562 164

# **Vision and Mission of Nagarjuna College of Engineering and Technology**

## **Vision**

- Leadership and Excellence in education.

## **Mission**

- To fulfill the vision by imparting total quality education replete with the philosophy of blending human values and academic professionalism.

## **Quality policy**

- Nagarjuna College of Engineering and Technology (NCET) shall be maintained, as an “Institution of Excellence”, in the domains of Engineering, Technology and Management studies through continual improvement of system, processes and academic professionalism.

## **Department of MBA**

### **Vision**

Leadership and Excellence in education

### **Mission**

‘Imparting total quality education replete with the philosophy of blending human values and academic professionalism’

### **Quality Policy:**

Nagarjuna College of Engineering and Technology (NCET) shall be maintained, as an “Institution of Excellence”, in the domains of Engineering, Technology and Management studies through continual improvement of system, processes and academic professionalism.

### **Vision**

The department aims at providing a practical approach to management education, which also nurtures the students’ overall personality, blending human values and professionalism.

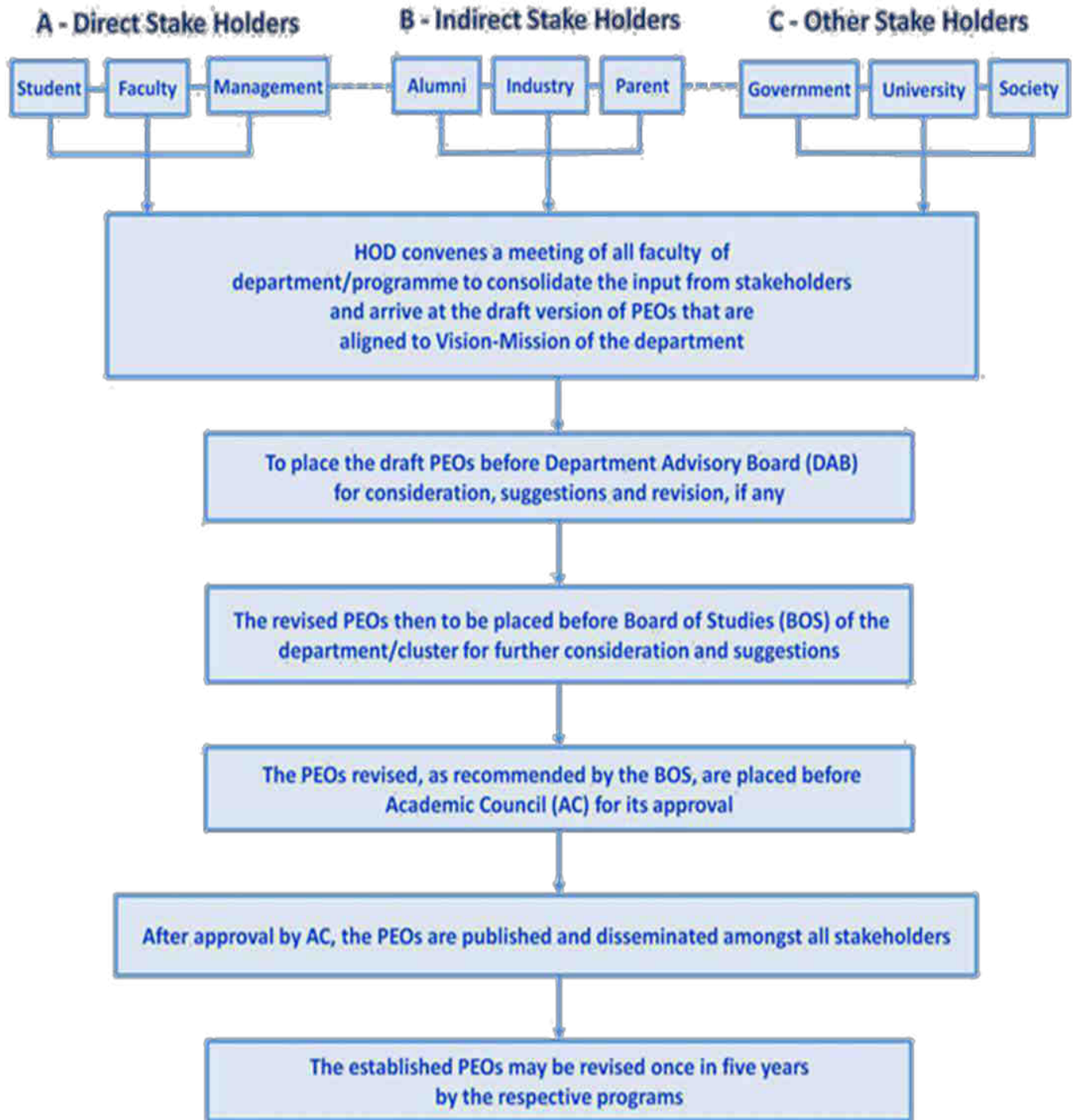
### **Mission**

- To make management education meaningful and practical by academic integrity and accountability.
- Developing respect and tolerance for the views of every individual.
- Giving attention to issues of national and global relevance.
- Creating an unfettered spirit of exploration, rationality and enterprise.

### **Quality Policy:**

Nagarjuna College of Engineering and Technology (NCET) shall be maintained, as an “Institution of Excellence”, in the domains of Engineering, Technology and Management studies through continual improvement of system, processes and academic professionalism.

## Process for Establishment of PEOs





## Program Educational Objective (PEOs)

Post completion of MBA program from Nagarjuna College of Engineering and Technology, Bengaluru, our students should be:

- **PEO1:**

**Intrapreneurs and a team-players** in a company by demonstrating holistic knowledge, required skills and attitude to perform managerial function in a professional manner and solve the problems by taking sustainability into consideration.

- **PEO2:**

**Entrepreneurs** in the area of their interest and exhibit the leadership skills in managing the team and performing various functional activities in the business.

- **PEO3:**

**Researchers, consultants and teachers** in management discipline by engaging in lifelong learning, imparting knowledge and providing creative and innovative solutions.

## Program Outcomes (POs)

- **PO1**

Apply knowledge of management theories and practices to solve business problems.

- **PO2**

Foster analytical and critical thinking abilities for data-based decision making.

- **PO3**

Develop value-based leadership.

- **PO4**

Understand, analyse and communicate global, economic, legal and ethical aspects of business.

- **PO5**

Lead themselves and others in the achievement of Organisational goals, contributing effectively to a team environment. (Lead and attain organizational goals by contributing and building a team).

- **PO6**

Apply research skills in the area of Business.

- **PO 7**

Demonstrate positive cognition during setbacks & crises, Anticipate change in the environment, manage and develop people accordingly.

- **PO 8**

Demonstrate entrepreneurial skills, innovate and run business.

### Program Specific Objectives (PSOs)

- **PSO 1**

To adapt to the rapid changes in the ever-changing business world and the technology through continuous learning keeping the societal issues in mind.

- **PSO 2**

To function effectively as an individual by applying their skill set to create, transfer and apply knowledge for the betterment of the organization and society at large.

### PEOs and PO Mapping

PEOs/ POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
PEO 1	2	3			3	2		
PEO 2		2	2		2		3	3
PEO 3		2		3		1	1	

### Extent of relation of CO's to PO's

- Level 1: Lower Level
- Level 2: Medium level
- Level 3: High Level

**2015-17**

**Scheme of Study - First Semester – MBA**

Sl. No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1.	15MBA11	Management & Organizational Behaviour	MBA	2-2-0-0	3	100
2.	15MBA12	Human Resource Management	MBA	3-0-2-0	4	100
3.	15MBA13	Marketing Management	MBA	3-0-2-0	4	100
4.	15MBA14	Accounting for Managers	MBA	3-0-2-4	5	100
5.	15MBA15	Quantitative Techniques	MBA	3-0-2-4	5	100
6.	15MBA16	Written Analysis & Executive Communication	MBA	3-0-2-0	4	100
7.	15MBA17	Economics for Managers	MBA	2-2-0-0	3	100
<b>Total</b>				<b>19-4-10-8</b>	<b>28</b>	<b>700</b>

L – Lecture      T-Tutorials      P-Practical      S – Self Study

## Scheme of Study – Second Semester – MBA

Sl. No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1.	15MBA21	Entrepreneurial Strategy	MBA	3-0-2-0	4	100
2.	15MBA22	Financial Management	MBA	3-2-0-0	4	100
<b>* Electives (Two papers from Three streams)</b>						
<b>I.HUMAN RESOURCE</b>						
3.	15MBAHR211	Labor Legislations & welfare	MBA			
4.	15MBAHR212	Recruitment Selection & Compensation Management	MBA	3-0-0-4	4	100
5.	15MBAHR213	Organization Change & Development	MBA	3-0-0-4	4	100
<b>II. MARKETING</b>						
6.	15MBAMM221	Consumer Behaviour	MBA			
7.	15MBAMM222	Retail Management & e-commerce	MBA	3-0-0-4	4	100
8.	15MBAMM223	Service Marketing	MBA	3-0-0-4	4	100
<b>III. FINANCE</b>						
9.	15MBAFM231	Advanced Financial Management	MBA			
10	15MBAFM232	Security Analysis and Portfolio Management	MBA	3-0-0-4	4	100
11	15MBAFM233	Project Management	MBA	3-0-0-4	4	100
<b>IV. BANKING &amp; INSURANCE</b>						
12	15MBAB&I 241	Principles & Practices of Banking & Insurance	MBA			
13	15MBAB&I 242	Banking & Insurance Products	MBA	3-0-0-4	4	100
14	15MBAB&I 243	Microfinance Management	MBA	3-0-0-4	4	100
<b>Total</b>				<b>24-2-2-24</b>	<b>32</b>	<b>800</b>

L – Lecture      T-Tutorials      P-Practical      S – Self Study

## Scheme of Study - Third Semester – MBA

Sl. No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1.	15MBA31	Legal aspects of Business	MBA	3-0-1-0	4	100
<b>* Electives (Three papers from Two streams)</b>						
<b>I. HUMAN RESOURCE</b>						
2.	15MBAHR311	International Human Resource Management	MBA	2-0-0-1	3	100
3.	15MBAHR312	Learning & development	MBA	2-0-0-1	3	100
4.	15MBAHR 313	Work place ethics	MBA	2-0-0-1	3	100
5.	15MBAHR314	Personal growth & Stress Management	MBA	2-0-0-1	3	100
6.	15MBAHR 315	Public relations, conflict & negotiation management	MBA	2-0-0-1	3	100
<b>II. MARKETING</b>						
7.	15MBAMM321	Integrated marketing communications & Social Media marketing	MBA	2-0-0-1	3	100
8.	15MBAMM322	International marketing management	MBA	2-0-0-1	3	100
9.	15MBAMM323	Supply chain & logistics Management	MBA	2-0-0-1	3	100
10.	15MBAMM324	Strategic brand management	MBA	2-0-0-1	3	100
11.	15MBAMM325	Marketing research	MBA	2-0-0-1	3	100
<b>III. FINANCE</b>						
12.	15MBAFM331	Management Accounting & control systems	MBA	2-0-0-1	3	100
13	15MBAFM332	Mergers & Acquisitions & corporate Restructuring	MBA	2-0-0-1	3	100
14	15MBAFM333	International Financial management	MBA	2-0-0-1	3	100
15	15MBAFM334	Tax Management	MBA	2-0-0-1	3	100
16	15MBAFM335	Futures & options	MBA	2-0-0-1	3	100
<b>IV. BANKING &amp; INSURANCE</b>						
17	15MBAB&I 341	Banking Technology Management	MBA	2-0-0-1	3	100
18	15MBAB&I 342	International Banking	MBA	2-0-0-1	3	100
19	15MBAB&I 343	Investment Banking & Financial Services	MBA	2-0-0-1	3	100
20	15MBAB&I 344	Treasury & Forex Management	MBA	2-0-0-1	3	100
21	15MBAB&I 345	Strategic Credit Management	MBA	2-0-0-1	3	100
22	15MBA32	Mini Project	MBA	0-0-0-4	4	100
<b>Total</b>				<b>24-2-2-24</b>	<b>26</b>	<b>800</b>

L – Lecture      T-Tutorials      P-Practical      S – Self Study

## **MINI PROJECT (Total Credit – 4)**

Guidelines for 4 Week Project work (15MBA37) between 3rd and 4th semester Autonomous MBA

### **OBJECTIVE**

To expose the students to the working of the organization/ company /industry

To take up an in-depth study of an issue / problem in the area of General Management/Any area of specialization

### **STRUCTURE**

The project work shall consist of three parts

Part - A - Study of the industry - One week - 20% of the marks is allocated

Part - B - Study of an Issue / Problem -Two weeks - 40% of the marks is allocated

Part – C - Report Writing – One week -40% of the marks is allocated

### **GENERAL GUIDELINES**

1. The project work shall be for a period of 04 weeks immediately after the completion of 2nd Sem Examinations but before the commencement of the 3rd semester classes.
2. The Subject code of the project work report shall be 15MBA37 and shall be compulsory for all the students.
3. The Institution shall receive ONE copy of the project report prior to the commencement of the 3rd semester.
4. The student shall seek the guidance of the internal guide on a continuous basis, and the guide shall give a certificate to the effect that the candidate has worked satisfactorily under his/her guidance.
6. On completion of the project work, student shall prepare a report with the following format.
  - i. The Project report shall be prepared using word processor viz. MS Word with New Times Roman, 12 font size and a maximum of 15 pages
  - ii. All the reports shall be printed in the A4 size 1” margin on all the sides.
  - iii. The report shall be bound, facing sheet indicating the name of the students, title, month & year of submission
  - iv. A certificate by the guide and HOD indicating the bonafide performance of the project by the student to be enclosed.
  - v. An undertaking by the student to the effect that the work is independently carried out by him.

### **PART - A**

**INDUSTRY PROFILE-** Broad outline of the industry

**SWOT analysis**

2. COMPANY PROFILE (When required)

- a. Background and inception of the company
- b. Nature of the business carried
- c. Vision, Mission and Quality Policy
- d. Products/ Services Profile
- e. Area of Operation – Global / National / Regional
- f. Competitors Information
- g. Achievement/Award if any

**PART – B**

1.

- a. General Introduction
- b. Statement of the problem
- c. Objectives of the study
- d. Need for the Study
- e. Methodology used
- f. Limitations of the study

**PART – C**

Analysis: Interpretation of results, findings, observations

- c. Conclusions and suggestions
- d. Annexure
  - Questionnaire/schedule relevant to the project
  - Figures, graphs, photographs etc.,
- e. Bibliography

**TOPICS FOR PROJECTS:**

**Group –I:** Organizational study and Identification of a problem in the organization

Ex: Absenteeism, Low Sales etc.

Group –II: Declining trend for higher education w.r.t. Biotech and Higher Education

Group –III: Health Care Management with special reference to Diabetes Self Care Management

Group –IV: Waste Management at Chikballapur

Group – V: A Study on problems and prospects for Agriculture in Chikballapur

**Scheme of Study -Fourth Semester – MBA**

**Management Thesis (Total Credit – 14)**

**To be carried out for entire semester.**

**TOTAL CREDITS**

<b>I SEM</b>	<b>II SEM</b>	<b>III SEM</b>	<b>IV SEM</b>	<b>TOTAL</b>
<b>28</b>	<b>32</b>	<b>26</b>	<b>14</b>	<b>100</b>





**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System CBCS**

***Outcome Based Education Curriculum***

***2017-2019***

**DEPARTMENT  
OF  
MASTER OF BUSINESS ADMINISTRATION**

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, Venkatagirikote Post, Devanahalli taluk,  
Bangalore district - 562 164

## **Department of MBA**

### **Vision**

Leadership and Excellence in education

### **Mission**

‘Imparting total quality education replete with the philosophy of blending human values and academic professionalism’

### **Quality Policy:**

Nagarjuna College of Engineering and Technology (NCET) shall be maintained, as an “Institution of Excellence”, in the domains of Engineering, Technology and Management studies through continual improvement of system, processes and academic professionalism.

### **Vision**

The department aims at providing a practical approach to management education, which also nurtures the students’ overall personality, blending human values and professionalism.

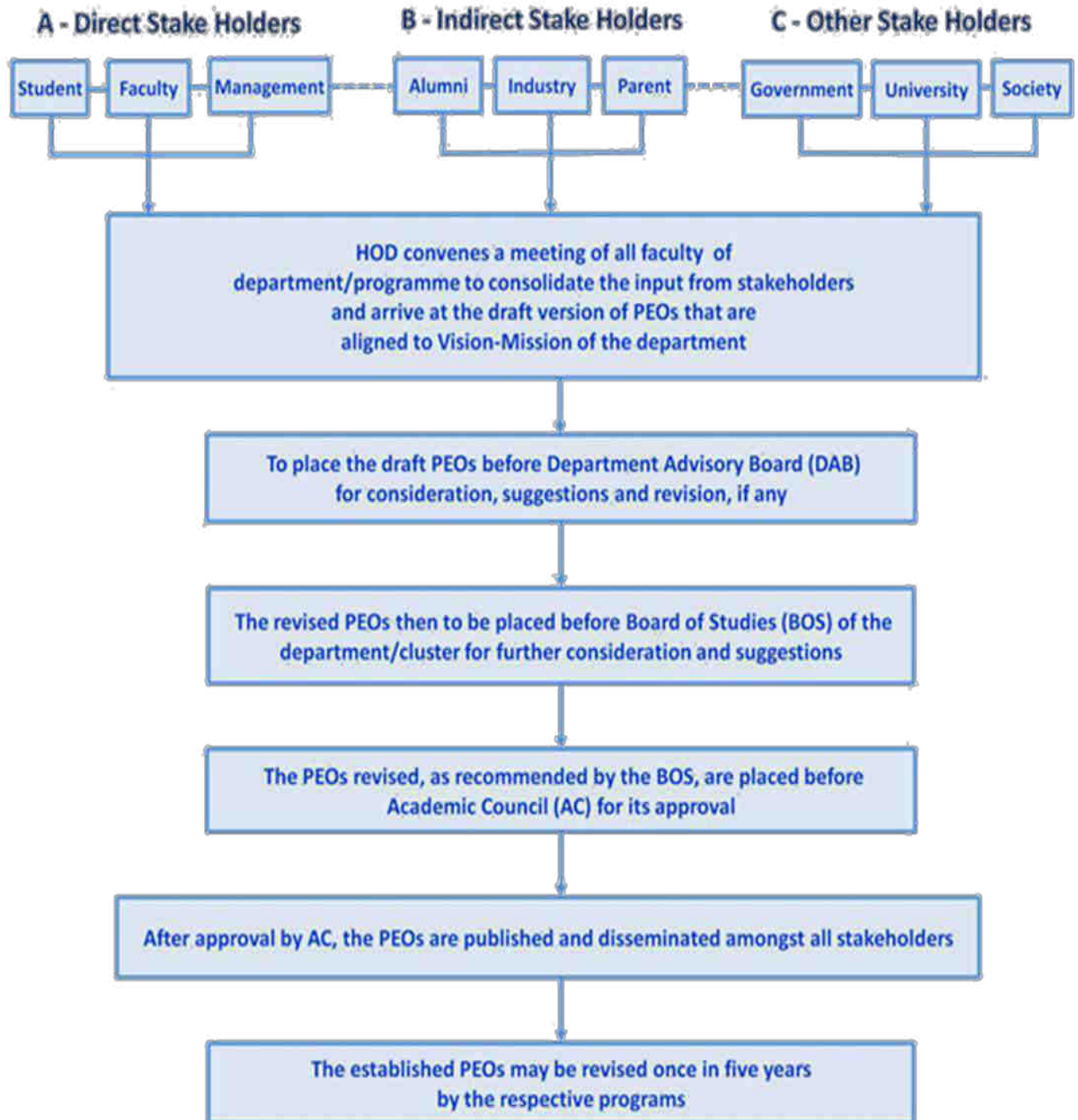
### **Mission**

- To make management education meaningful and practical by academic integrity and accountability.
- Developing respect and tolerance for the views of every individual.
- Giving attention to issues of national and global relevance.
- Creating an unfettered spirit of exploration, rationality and enterprise.

### **Quality Policy:**

Nagarjuna College of Engineering and Technology (NCET) shall be maintained, as an “Institution of Excellence”, in the domains of Engineering, Technology and Management studies through continual improvement of system, processes and academic professionalism.

## Process for Establishment of PEOs



## Program Educational Objective (PEOs)

Post completion of MBA program from Nagarjuna College of Engineering and Technology, Bengaluru, our students should be:

- **PEO1:**

**Intrapreneurs and a team-players** in a company by demonstrating holistic knowledge, required skills and attitude to perform managerial function in a professional manner and solve the problems by taking sustainability into consideration.

- **PEO2:**

**Entrepreneurs** in the area of their interest and exhibit the leadership skills in managing the team and performing various functional activities in the business.

- **PEO3:**

**Researchers, consultants and teachers** in management discipline by engaging in lifelong learning, imparting knowledge and providing creative and innovative solutions.

## Program Outcomes (POs)

- **PO1**

Apply knowledge of management theories and practices to solve business problems.

- **PO2**

Foster analytical and critical thinking abilities for data-based decision making.

- **PO3**

Develop value-based leadership.

- **PO4**

Understand, analyse and communicate global, economic, legal and ethical aspects of business.

- **PO5**

Lead themselves and others in the achievement of Organisational goals, contributing effectively to a team environment. (Lead and attain organizational goals by contributing and building a team).

- **PO6**

Apply research skills in the area of Business.

- **PO 7**

Demonstrate positive cognition during setbacks & crises, Anticipate change in the environment, manage and develop people accordingly.

- **PO 8**

Demonstrate entrepreneurial skills, innovate and run business.

### Program Specific Objectives (PSOs)

- **PSO 1**

To adapt to the rapid changes in the ever-changing business world and the technology through continuous learning keeping the societal issues in mind.

- **PSO 2**

To function effectively as an individual by applying their skill set to create, transfer and apply knowledge for the betterment of the organization and society at large.

### PEOs and PO Mapping

PEOs/ POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
PEO 1	2	3			3	2		
PEO 2		2	2		2		3	3
PEO 3		2		3		1	1	

### Extent of relation of CO's to PO's

- Level 1: Lower Level
- Level 2: Medium level
- Level 3: High Level

## SCHEME OF STUDY FOR 2017-19 MBA BATCH

### Scheme of Study - First Semester MBA

Sl. No	Course Code	Course Name	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
8.	17MBA11	Management & Organizational Behaviour	MBA	3-0-0-4	4	100
9.	17MBA12	Executive Communication	MBA	2-0-2-4	4	100
10.	17MBA13	Business Ethics and Corporate Governance	MBA	3-0-0-4	4	100
11.	17MBA14	Managerial Economics	MBA	3-0-0-4	4	100
12.	17MBA15	Accounting for Managers	MBA	3-0-2-0	4	100
13.	17MBA16	Quantitative Techniques	MBA	3-0-2-0	4	100
14.	17MBA17	Managerial Skill Development	MBA	0-0-0-8	2	100
<b>Total</b>				<b>17-0-6-24</b>	<b>26</b>	<b>700</b>

L – Lecture      T-Tutorials      P-Practical      S – Self Study

**Note:** Plan of Action for the Course code 17MBA17 (Managerial skill development)

- Rural community development initiative -Visit to rural areas and identifying a persisting problem and presenting a report.- 1 Credit
- Art of Public speaking (Presenting a prepared speech before the audience and Impromptu speech) – 1 credit. Certification course on the same shall be implemented.

  
**PRINCIPAL**  
 Nagarjuna College of Engineering & Technology  
 Devanahalli (Tq) Bengaluru (Dt.)-Pin: 562164

### Scheme of Study –Second Semester MBA

Sl. No	Course Code	Course Name	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
10.	17MBA21	Human Resources Management	MBA	3-0-0-4	4	100
11.	17MBA22	Marketing Management	MBA	3-0-0-0	3	100
12.	17MBA23	Financial Management	MBA	3-0-0-4	4	100
13.	17MBA24	Business Regulations	MBA	3-0-0-4	4	100
14.	17MBA25	Business Research Methods	MBA	2-0-2-0	3	100
15.	17MBA26	International Business and Strategic Management	MBA	3-0-2-0	4	100
16.	17MBA27	IT for Managers	MBA	0-2-2-0	2	50
17.	17MBA28	Inplant Training	MBA	0-0-0-8	2	50
		<b>Total</b>		<b>17-2-6-20</b>	<b>26</b>	<b>700</b>

L – Lecture      T-Tutorials      P-Practical      S – Self Study

## Scheme of Study - Third Semester MBA

Sl. No	CourseCode	Course Name	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
13.	17MBA31	Entrepreneurship Skill Development	MBA	2-0-4-0	4	100
14.	17MBAB&I32X	<b>BANKING &amp; INSURANCE</b>	MBA	3-0-0-4	4	100
15.	17MBAHR33X	<b>HUMAN RESOURCE</b>	MBA	3-0-0-4	4	100
16.	17MBAMM34X	<b>MARKETING</b>	MBA	3-0-0-4	4	100
17.	17MBAFM35X	<b>FINANCE</b>	MBA	3-0-0-4	4	100
<b>* Electives ( Dual specialization-Students have to select Two papers from Two specializations.The same specializations have to be carried forward for IV sem)</b>						
<b>BANKING &amp; INSURANCE</b>						
2.	17MBAB&I321	Principles and Practices of Banking	MBA	3-0-0-4	4	100
	17MBAB&I322	Banking & Insurance Products	MBA	3-0-0-4	4	100
	17MBAB&I323	Microfinance Management	MBA	3-0-0-4	4	100
	17MBAB&I 324	Strategic Credit Management	MBA	3-0-0-4	4	100
<b>HUMAN RESOURCE</b>						
3.	17MBAHR331	Strategic HRM	MBA	3-0-0-4	4	100
	17MBAHR332	Performance Management and Reward System	MBA	3-0-0-4	4	100
	17MBAHR333	International HRM	MBA	3-0-0-4	4	100
	17MBAHR 334	Labour Laws	MBA	3-0-0-4	4	100
<b>MARKETING</b>						
4.	17MBAMM341	Consumer Behaviour	MBA	3-0-0-4	4	100
	17MBAMM342	Supply chain and Logistics Management	MBA	3-0-0-4	4	100
	17MBAMM353	Sales and Retail Management	MBA	3-0-0-4	4	100
	17MBAMM354	Services Marketing	MBA	3-0-0-4	4	100
<b>FINANCE</b>						



5.	17MBAFM351	Advance Financial Management	MBA	3-0-0-4	4	100
	17MBAFM352	Security Analysis and Portfolio Management	MBA	3-0-0-4	4	100
	17MBAFM353	Indian Tax System	MBA	3-0-0-4	4	100
	17MBAFM354	Cost Management	MBA	3-0-0-4	4	100
<b>Total</b>				<b>14-0-4-16</b>	<b>20</b>	<b>500</b>

L – Lecture      T-Tutorials      P-Practical      S – Self Study

### Scheme of Study - Fourth Semester – MBA

Sl. No	Course Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1.	17MBA41	Project Work	MBA	0-0-12-24	12	300
2.	17MBA42	Total Quality Management	MBA	3-0-0-4	4	100
<b>* Electives (Dual specialization-Students have to select Two papers from Two specializations .The specializations taken in III Sem. Continues )</b>						
<b>BANKING &amp; INSURANCE</b>						
3.	17MBAB&I431	Banking Technology Management	MBA	3-0-0-0	3	100
	17MBAB&I432	International Banking	MBA	3-0-0-0	3	100
	17MBAB&I433	Investment Banking & Financial Services	MBA	3-0-0-0	3	100
	17MBAB&I434	Treasury &Forex Management	MBA	3-0-0-0	3	100
<b>HUMAN RESOURCE</b>						
4.	17MBAHR441	Consultancy Management	MBA	3-0-0-0	3	100
	17MBAHR442	HR Analytics	MBA	3-0-0-0	3	100
	17MBAHR443	Leadership Development	MBA	3-0-0-0	3	100
	17MBAHR444	Personal Growth and Interpersonal effectiveness	MBA	3-0-0-0	3	100
<b>MARKETING</b>						
5.	17MBAMM451	Strategic Brand Management	MBA	3-0-0-0	3	100
	17MBAMM452	International Marketing	MBA	3-0-0-0	3	100
	17MBAMM453	Integrated Marketing Communications and Social Media	MBA	3-0-0-0	3	100
	17MBAMM454	Rural Marketing	MBA	3-0-0-0	3	100
<b>FINANCE</b>						
6.	17MBAFM461	Financial Derivatives	MBA	3-0-0-0	3	100
	17MBAFM462	Project Appraisal, Planning and Control	MBA	3-0-0-0	3	100

17MBAFM463	Mergers Acquisitions and Corporate Restructuring	MBA	3-0-0-0	3	100
17MBAFM464	International Financial Management	MBA	3-0-0-0	3	100
<b>Total</b>			<b>15-0-12-28</b>	<b>28</b>	<b>800</b>

L – Lecture      T-Tutorials      P-Practical      S – Self Study

### **SEMESTER WISE CREDIT DISTRIBUTION**

<b>Sem</b>	<b>Credits</b>
I	26
II	26
III	20
IV	28
<b>Total</b>	<b>100</b>

  
**PRINCIPAL**  
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**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

**Choice Based Credit System CBCS**

***Outcome Based Education Curriculum***

***2018-2020***

**DEPARTMENT  
OF  
MASTER OF BUSINESS ADMINISTRATION**

**NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**

Mudugurki Village, VenkatagiriKote Post, Devanahalli taluk,  
Bangalore district - 562 164

## **Department of MBA**

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Leadership and Excellence in education

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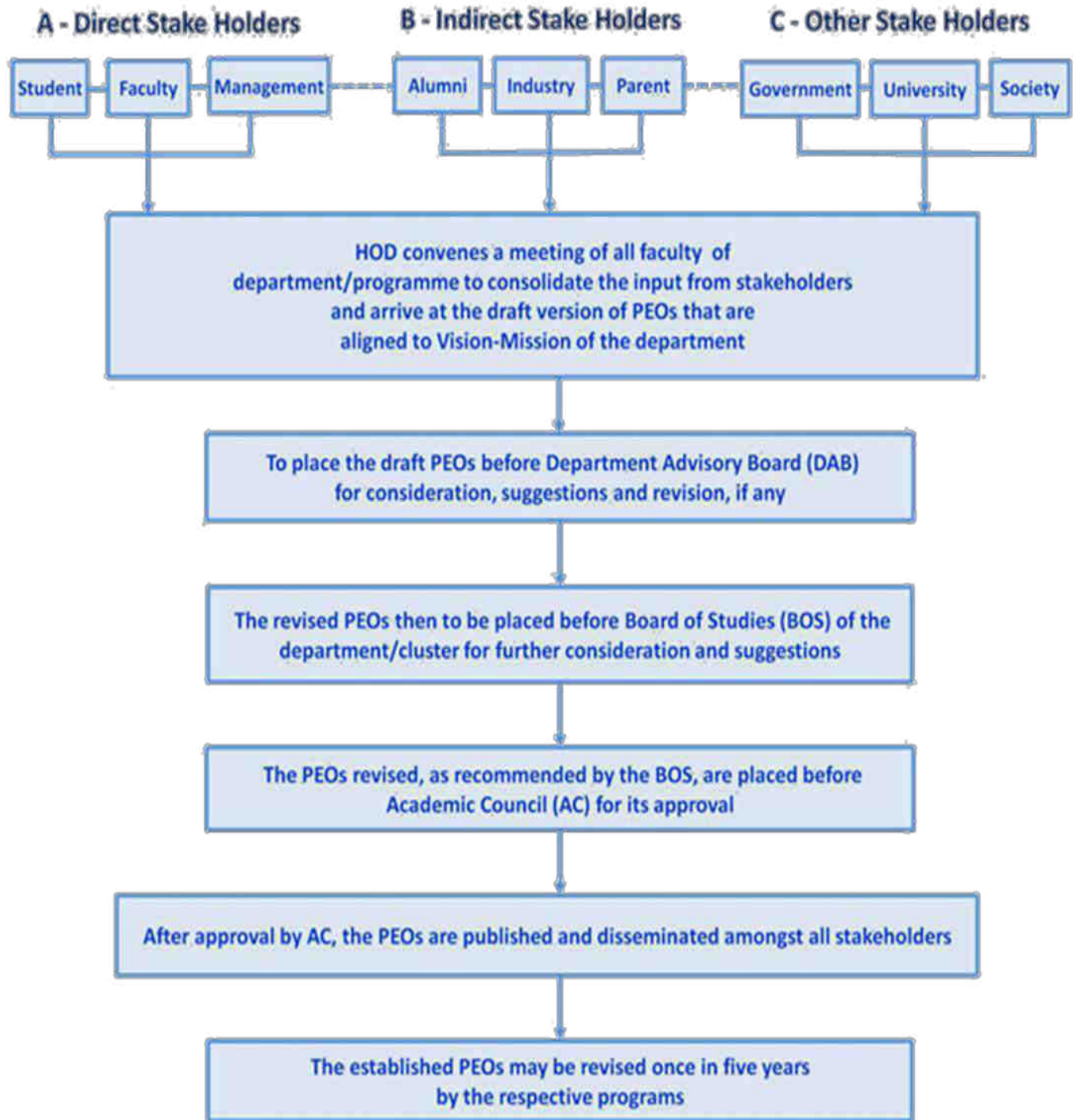
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Apply knowledge of management theories and practices to solve business problems.

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PEO 1	2	3			3	2		
PEO 2		2	2		2		3	3
PEO 3		2		3		1	1	

### Extent of relation of CO's to PO's

- Level 1: Lower Level
- Level 2: Medium level
- Level 3: High Level

## SCHEME OF STUDY FOR 2018-20MBA BATCH

### Scheme of Study - First Semester MBA

Sl. No	Course Code	Course Name	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
15.	18MBA11	Management & Organizational Behaviour	MBA	3-0-0-4	4	100
16.	18MBA12	Executive Communication and Managerial Skill Development	MBA	2-0-2-4	4	100
17.	18MBA13	Business Regulations	MBA	3-0-0-0	3	100
18.	18MBA14	Managerial Economics	MBA	3-0-0-4	4	100
19.	18MBA15	Accounting for Managers	MBA	3-0-2-0	4	100
20.	18MBA16	Business Research Methods & Statistics	MBA	3-0-2-0	4	100
21.	18MBA17	Innovation, Creativity & Critical Problem-Solving Skills	MBA	3-0-0-0	3	100
<b>Total</b>				<b>20-0-6-12</b>	<b>26</b>	<b>700</b>

L – Lecture      T-Tutorials      P-Practical      S – Self Study

**Note:**

Plan of Action for the Course code: 18MBA12 -Executive Communication and Managerial skill development

- Rural community development initiative -Visit to rural areas and identifying a persisting problem and presenting a report - 1 Credit



- Art of Public speaking (Presenting a prepared speech before the audience and Impromptu speech) – 1 Credit. Certification course on the same shall be implemented.

### **Scheme of Study –Second Semester MBA**

Sl. No	Course Code	Course Name	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
18.	18MBA21	Human Resources Management	MBA	3-0-0-0	3	100
19.	18MBA22	Marketing Management	MBA	3-0-0-0	3	100
20.	18MBA23	Financial Management	MBA	3-0-0-4	4	100
21.	18MBA24	Business Ethics and Corporate Governance	MBA	3-0-0-4	4	100
22.	18MBA25	Production and Operations Management	MBA	3-0-2-0	4	100
23.	18MBA26	International Business	MBA	3-0-0-4	4	100
24.	18MBA27	In-plant Training	MBA	0-0-0-16	4	100
		<b>Total</b>		<b>18-0-2-28</b>	<b>26</b>	<b>700</b>

L – Lecture      T-Tutorials      P-Practical      S – Self Study

### **Scheme of Study - Third Semester MBA**

Sl. No	CourseCode	Course Name	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
18.	18MBA31	Strategic Management	MBA	3-0-0-4	4	100
19.	18MBA32	Entrepreneurship Development	MBA	3-0-0-4	4	100
20.	18MBA33	Certification Course	External Training	0-0-8-0	4	100
21.	18MBAHR34X	<b>HUMAN RESOURCE</b>	MBA	3-0-0-0	3	100
22.	18MBAMM34X	<b>MARKETING</b>	MBA	3-0-0-0	3	100
23.	18MBAFM34X	<b>FINANCE</b>	MBA	3-0-0-0	3	100
<b>* Electives ( Two papers from any Two streams)</b>						
<b>HUMAN RESOURCE</b>						
4.	18MBAHR341	Strategic Human Resource Management	MBA	3-0-0-0	3	100
	18MBAHR342	Performance Management and Reward System	MBA	3-0-0-0	3	100
	18MBAHR343	International Human Resource Management	MBA	3-0-0-0	3	100
	18MBAHR 344	Labour Laws	MBA	3-0-0-0	3	100
<b>MARKETING</b>						
5.	18MBAMM341	Consumer Behaviour	MBA	3-0-0-0	3	100
	18MBAMM342	Supply Chain and Logistics Management	MBA	3-0-0-0	3	100
	18MBAMM343	Sales and Retail Management	MBA	3-0-0-0	3	100
	18MBAMM344	Services Marketing	MBA	3-0-0-0	3	100
<b>FINANCE</b>						
6.	18MBAFM341	Advance Financial Management	MBA	3-0-0-0	3	100
	18MBAFM342	Security Analysis and Portfolio Management	MBA	3-0-0-0	3	100
	18MBAFM343	Indian Tax System	MBA	3-0-0-0	3	100
	18MBAFM344	Cost Management	MBA	3-0-0-0	3	100
<b>Total</b>				<b>18-0-8-8</b>	<b>24</b>	<b>700</b>

L – Lecture      T-Tutorials      P-Practical      S – Self Study

**Certification Course:**

- a. **Advanced Excel**
- b. **Six Sigma**

## **Scheme of Study - Fourth Semester – MBA**

Sl. No	Course Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1.	18MBA41	Project Work	MBA	0-0-0-48	12	300
2.	18MBAHR42X	<b>HUMAN RESOURCE</b>	MBA	3-0-0-0	3	100
3.	18MBAMM42X	<b>MARKETING</b>	MBA	3-0-0-0	3	100
4.	18MBAFM42X	<b>FINANCE</b>	MBA	3-0-0-0	3	100
<b>* Electives ( Two papers from Four streams)</b>						
<b>HUMAN RESOURCE</b>						
2.	18MBAHR421	Consultancy Management	MBA	3-0-0-0	3	100
	18MBAHR422	Human Resource Analytics	MBA	3-0-0-0	3	100
	18MBAHR423	Leadership Development	MBA	3-0-0-0	3	100
	18MBAHR424	Personal Growth and Interpersonal Effectiveness	MBA	3-0-0-0	3	100
<b>MARKETING</b>						
3.	18MBAMM421	Strategic Brand Management	MBA	3-0-0-0	3	100
	18MBAMM422	International Marketing	MBA	3-0-0-0	3	100
	18MBAMM423	Integrated Marketing Communications and Social Media	MBA	3-0-0-0	3	100
	18MBAMM424	Rural Marketing	MBA	3-0-0-0	3	100
<b>FINANCE</b>						
4.	18MBAFM421	Financial Derivatives	MBA	3-0-0-0	3	100
	18MBAFM422	Project Appraisal, Planning and Control	MBA	3-0-0-0	3	100
	18MBAFM423	Mergers Acquisitions and Corporate Restructuring	MBA	3-0-0-0	3	100
	18MBAFM424	International Financial Management	MBA	3-0-0-0	3	100
<b>Total</b>				<b>12-0-0-48</b>	<b>24</b>	<b>700</b>

L – Lecture      T-Tutorials      P-Practical      S – Self Study

- Optional Certification Course in each specialization against a course can be allowed.

## **SEMESTER WISE CREDIT DISTRIBUTION**

<b>Sem</b>	<b>Credits</b>
I	26
II	26
III	24
IV	24
<b>Total</b>	<b>100</b>

**Department of MBA**

**NAGARJUNA COLLEGE OF ENGINEERING AND TECHNOLOGY**

**Bengaluru – 562 164**



**An Autonomous College under  
VTU**

***Choice Based Credit System CBCS***

# **Scheme and Syllabus**

## **2019 - 21**

**DEPARTMENT  
OF  
MASTER OF BUSINESS ADMINISTRATION**

***Outcome Based Education Curriculum***

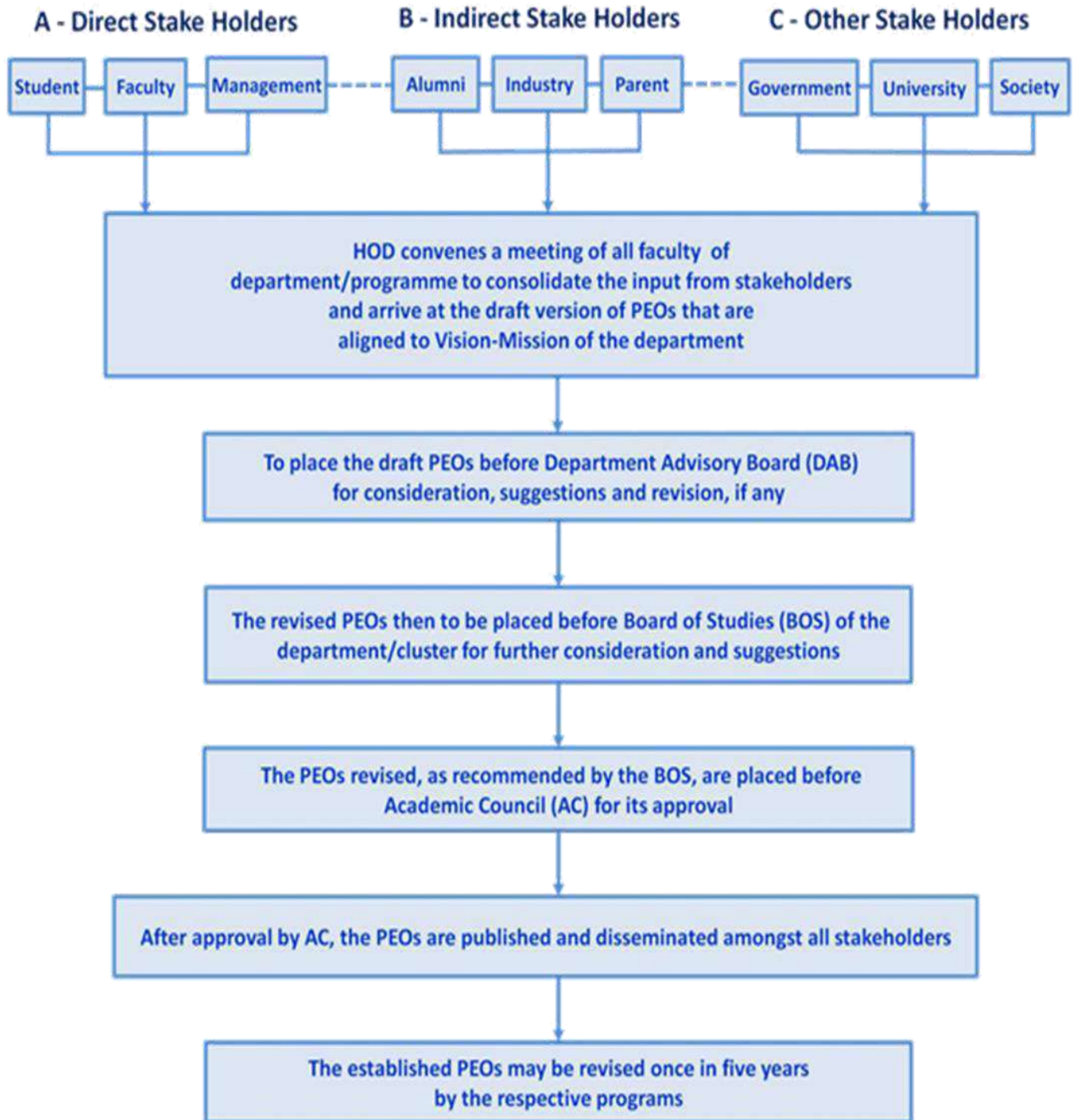
**Vision**

The department aims at providing excellent management education, which fosters the holistic development of the students' personality with human values and global outlook.

**Mission**

- To make management education meaningful and practical by academic integrity and accountability.
- Developing respect and tolerance for the views of every individual.
- Giving attention to issues of national and global relevance.
- Creating an unfettered spirit of exploration, rationality and enterprise.

## Process for Establishment of PEOs



## **Program Educational Objective (PEOs)**

Post completion of MBA program from Nagarjuna College of Engineering and Technology, Bengaluru, our students should be:

- **PEO1:**

**Intrapreneurs and a team-players** in a company by demonstrating holistic knowledge, required skills and attitude to perform managerial function in a professional manner and solve the problems by taking sustainability into consideration.

- **PEO2:**

**Entrepreneurs** in the area of their interest and exhibit the leadership skills in managing the team and performing various functional activities in the business.

- **PEO3:**

**Researchers, consultants and teachers** in management discipline by engaging in lifelong learning, imparting knowledge and providing creative and innovative solutions.

## **Program Outcomes (POs)**

- **PO1**

Apply knowledge of management theories and practices to solve business problems.

- **PO2**

Foster analytical and critical thinking abilities for data-based decision making.

- **PO3**

Develop value-based leadership.

- **PO4**

Understand, analyse and communicate global, economic, legal and ethical aspects of business.

- **PO5**

Lead themselves and others in the achievement of Organisational goals, contributing effectively to a team environment. (Lead and attain organizational goals by contributing and building a team).

- **PO6**

Apply research skills in the area of Business.



- **PO 7**

Demonstrate positive cognition during setbacks & crises, Anticipate change in the environment, manage and develop people accordingly.

- **PO 8**

Demonstrate entrepreneurial skills, innovate and run business.

### **Program Specific Objectives (PSOs)**

- **PSO 1**

To adapt to the rapid changes in the ever-changing business world and the technology through continuous learning keeping the societal issues in mind.

- **PSO 2**

To function effectively as an individual by applying their skill set to create, transfer and apply knowledge for the betterment of the organization and society at large.

### **PEOs and PO Mapping**

PEOs/ POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
PEO 1	X	X			X	X		
PEO 2			X		X		X	X
PEO 3	X	X		X		X	X	

  
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## SCHEME OF STUDY FOR 2019-21 MBA BATCH

### Scheme of Study – Third Semester MBA

Sl. No	Course Code	Course Name	Teaching Dept.	L-T-P-S (Hrs./week)	Total Credits	Marks
1.	19MBA31	Entrepreneurial Development	MBA	4-0-0-0	4	100
2.	19MBAHR32X	<b>HUMAN RESOURCE</b>	MBA	3-0-0-0	3	100
3.	19MBAMM32X	<b>MARKETING</b>	MBA	3-0-0-0	3	100
4.	19MBAFM32X	<b>FINANCE</b>	MBA	3-0-0-0	3	100
5.	19MBASCM32X	<b>SUPPLY CHAIN MANAGEMENT</b>	MBA	3-0-0-0	3	100
<b>* Electives (Three papers from Two streams, 6 Papers from two streams)</b>						
<b>HUMAN RESOURCE</b>						
2.	19MBAHR321	Organisation Change and Development	MBA	3-0-0-0	3	100
	19MBAHR322	Personal Growth and Interpersonal Effectiveness	MBA	3-0-0-0	3	100
	19MBAHR323	Performance Management and Reward Systems	MBA	3-0-0-0	3	100
	19MBAHR324	Labour Laws	MBA	3-0-0-0	3	100
	19MBAHR325	Strategic Human Resource Management	MBA	3-0-0-0	3	100
<b>MARKETING</b>						
3.	19MBAMM321	Services Marketing	MBA	3-0-0-0	3	100
	19MBAMM322	Consumer Behaviour	MBA	3-0-0-0	3	100
	19MBAMM323	Strategic Brand Management	MBA	3-0-0-0	3	100
	19MBAMM324	Marketing Research and Analytics	MBA	3-0-0-0	3	100
	19MBAMM325	International Marketing Management	MBA	3-0-0-0	3	100
<b>FINANCE</b>						
4.	19MBAFM321	Cost Accounting	MBA	3-0-0-0	3	100
	19MBAFM322	Investment Management	MBA	3-0-0-0	3	100
	19MBAFM323	Direct Tax	MBA	3-0-0-0	3	100
	19MBAFM324	Mergers Acquisitions and Corporate Restructuring	MBA	3-0-0-0	3	100
	19MBAFM325	Financial Market and Services	MBA	3-0-0-0	3	100
<b>SUPPLY CHAIN MANAGEMENT</b>						
5.	19MBASCM321	Advanced Operations Research	MBA	3-0-0-0	3	100

	19MBASCM322	Supply Chain and logistics Management	MBA	3-0-0-0	3	100
	19MBASCM323	Green Supply Chain Management	MBA	3-0-0-0	3	100
	19MBASCM324	Strategic Purchasing and Quality Management	MBA	3-0-0-0	3	100
	19MBASCM325	Supply Chain Information System	MBA	3-0-0-0	3	100
	<b>Total</b>			<b>22-0-0-0</b>	<b>22</b>	<b>700</b>

L – Lecture    T-Tutorials    P-Practical    S – Self Study

### Scheme of Study - Fourth Semester MBA

Sl. No	Course Code	Course Name	Teaching Dept.	L-T-P-S (Hrs./week)	Total Credits	Marks
1.	19MBA41	<b>Project Work</b>	MBA	0-0-0-48	12	300
2.	19MBAHR42X	<b>HUMAN RESOURCE</b>	MBA	3-0-0-0	3	100
3.	19MBAMM42X	<b>MARKETING</b>	MBA	3-0-0-0	3	100
4.	19MBAFM42X	<b>FINANCE</b>	MBA	3-0-0-0	3	100
5.	19MBASCM42X	<b>SUPPLY CHAIN MANAGEMENT</b>	MBA	3-0-0-0	3	100
<b>* Electives (Two Papers from Two streams, 4 papers from two streams)</b>						
<b>HUMAN RESOURCE</b>						
2.	19MBAHR421	Organizational Leadership Development	MBA	3-0-0-0	3	100
	19MBAHR422	International Human Resource Management	MBA	3-0-0-0	3	100
	19MBAHR423	Human Resource Metrics & Analytics	MBA	3-0-0-0	3	100
<b>MARKETING</b>						
3.	19MBAMM421	Sales and Retail Management	MBA	3-0-0-0	3	100
	19MBAMM422	Integrated Marketing Communication and Sales Promotion	MBA	3-0-0-0	3	100

**Outcome Based Education**  
**Credit Based System Curriculum**

	19MBAMM423	Digital and Social Media Marketing	MBA	3-0-0-0	3	100
<b>FINANCE</b>						
4.	19MBAFM421	Strategic Financial Management	MBA	3-0-0-0	3	100
	19MBAFM422	Financial Derivatives	MBA	3-0-0-0	3	100
	19MBAFM423	International Financial Management	MBA	3-0-0-0	3	100
<b>SUPPLY CHAIN MANAGEMENT</b>						
5.	19MBASCM421	Global Supply Chain Management	MBA	3-0-0-0	3	100
	19MBASCM422	Enterprise Resource Planning	MBA	3-0-0-0	3	100
	19MBASCM423	International Logistics Management	MBA	3-0-0-0	3	100
	<b>Total</b>			<b>12-0-0-48</b>	<b>24</b>	<b>700</b>

L – Lecture      T-Tutorials      P-Practical      S – Self Study

### **SEMESTER WISE CREDIT DISTRIBUTION**

Sem	Credits
I	26
II	28
III	22
IV	24
<b>Total</b>	<b>100</b>

  
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**NAGARJUNA**  
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***An Autonomous College under VTU***

**VISION**

**Leadership and Excellence in Education.**

**MISSION**

**To fulfill the vision by imparting total quality education replete with the philosophy of blending human values and academic professionalism.**

***Syllabus: I & II Sem B.E.***  
***Outcome Based Education Curricula***  
***Scheme and Syllabus***  
***With effect from Academic Year***  
**2020 - 2021**

## First Semester – Physics Cycle

Sl. No	Course Code	Course	Teaching Dept.	L:T:P (Hrs/week)	Total Credits	Marks
1	19MAT11	Engineering Mathematics-I	MAT	3:2:0	4	100
2	19PHY12	Engineering Physics	PHY	3:0:0	3	100
3	19CEF13	Civil Engineering Foundation	CV	3:0:0	3	100
4	19CED14	Computer Aided Engineering Drawing	ME	2:0:4	4	100
5	19ELN15	Basic Electronics (IC)	EC	2:0:2	3	100
6	19PHL16	Engineering Physics Laboratory	PHY	1:0:2	2	100
7	19CSD17	Communication Skill Development -I	HSS	0:2:0	1	100
<b>Total</b>				<b>14:4:8</b>	<b>20</b>	<b>700</b>

## First Semester – Chemistry Cycle

Sl. No	Course Code	Course	Teaching Dept.	L:T:P (Hrs/week)	Total Credits	Marks
1	19MAT11	Engineering Mathematics-I	MAT	3:2:0	4	100
2	19CHE12	Engineering Chemistry (IC)	CHE	3:0:2	4	100
3	19CCP13	Computer Concepts and C Programming	CS/IS	3:0:0	3	100
4	19MEF14	Mechanical Engineering Foundation (IC)	ME	2:0:2	3	100
5	19ELE15	Basic Electrical Engineering (IC)	EC	2:0:2	3	100
6	19CPL16	Computer Programming Laboratory	CS/IS	1:0:2	2	100
7	19CSD17	Communication Skill Development-I	HSS	0:2:0	1	100
<b>Total</b>				<b>14:4:8</b>	<b>20</b>	<b>700</b>

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study

## Second Semester – Physics Cycle

Sl. No	Subject Code	Subject	Teaching Dept.	L:T:P (Hrs/week)	Total Credits	Marks
1	19MAT21	Engineering Mathematics-II	MAT	3:2:0	4	100
2	19PHY22	Engineering Physics	PHY	3:0:0	3	100
3	19CEF23	Civil Engineering Foundation	CV	3:0:0	3	100
4	19CED24	Computer Aided Engineering Drawing (IC)	ME	2:0:4	4	100
5	19ELN25	Basic Electronics (IC)	EC	2:0:2	3	100
6	19PHL26	Engineering Physics Laboratory	PHY	1:0:2	2	100
7	19CSD27	Communication Skill Development-II	HSS	0:2:0	1	100
Total				14:4:8	20	700

## Second Semester – Chemistry Cycle

Sl. No	Course Code	Course	Teaching Dept.	L:T:P (Hrs/week)	Total Credits	Marks
1	19MAT21	Engineering Mathematics-II	MAT	3:2:0	4	100
2	19CHE22	Engineering Chemistry (IC)	CHE	3:0:2	4	100
3	19CCP23	Computer Concepts and C Programming	CS/IS	3:0:0	3	100
4	19MEF24	Mechanical Engineering Foundation (IC)	ME	2:0:2	3	100
5	19ELE25	Basic Electrical Engineering (IC)	EC	2:0:2	3	100
6	19CPL26	Computer Programming Laboratory	CS/IS	1:0:2	2	100
7	19CSD27	Communication Skill Development-II	HSS	0:2:0	1	100
Total				14:4:8	20	700

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study

NCET Scheme and Syllabus 1st Year 2019-20

3. H.K. Dass and Er. Rajnish Verma, "Higher Engineering Mathematics", S. Chand and Company Private Limited, New Delhi, 3<sup>rd</sup> Edition, 2014, ISBN: 9788121938907.

**E-Resources:**

1. <http://nptel.ac.in/courses.php?disciplineID=111>
2. [http://www.class-central.com/subject/math\(MOOCs\)](http://www.class-central.com/subject/math(MOOCs))
3. <http://academicearth.org/>

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*Syllabus: I & II Sem B.E.  
Outcome Based Education Curricula*

*Scheme and Syllabus*

*With effect from Academic Year*

*2019-20*

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Devanahalli (Ta) Bengaluru (Dt), Pin: 562110*



**First Semester – Physics Cycle**

Sl. No.	Course Code	Course	Teaching Dept.	L:T:P:S (Hrs/week)	Total Credits	Marks
1	19MAT11	Calculus and Linear Algebra	MAT	3:2:0:0	4	100
2	19PHY12	Engineering Physics	PHY	3:0:0:0	3	100
3	19CEF13	Civil Engineering Foundation	CV	3:0:0:0	3	100
4	19CED14	Computer Aided Engineering Drawing	ME	2:0:4:0	4	100
5	19ELN15	Basic Electronics (IC)	EC	2:0:2:0	3	100
6	19PHL16	Engineering Physics Laboratory	PHY	1:0:2:0	2	100
7	19CSD17	Communication Skill Development -I	HSS	0:2:0:0	1	100
Total				14:4:8:0	20	700

**First Semester – Chemistry Cycle**

Sl. No.	Course Code	Course	Teaching Dept.	L:T:P:S (Hrs/week)	Total Credits	Marks
1	19MAT11	Calculus and Linear Algebra	MAT	3:2:0:0	4	100
2	19CHE12	Engineering Chemistry (IC)	CHE	3:0:2:0	4	100
3	19CCP13	Computer Concepts and C Programming	CS/IS	3:0:0:0	3	100
4	19MEF14	Mechanical Engineering Foundation (IC)	ME	2:0:2:0	3	100
5	19ELE15	Basic Electrical Engineering (IC)	EC	2:0:2:0	3	100
6	19CPL16	Computer Programming Laboratory	CS/IS	1:0:2:0	2	100
7	19CSD17	Communication Skill Development-I	HSS	0:2:0:0	1	100
Total				14:4:8:0	20	700

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**Module – IV****Partial Differential Equations(PDE's):**

Formation of PDE –Eliminating the Arbitrary constants and arbitrary functions, solutions of non homogenous PDE by direct integration, Homogeneous PDEs involving derivative with respect to one independent variable only, Method of separation of variables. Solution of one dimensional wave equation, one dimensional heat equation and two dimensional Laplace equation by the method of separation of variables.

08 hours

**Module – V****Curve fitting and Statistical methods:**

Curve fitting by the method of least square: Straight line, parabola and exponential curves, Moments, skewness and kurtosis-problems. Rank correlation, Correlation and regression lines-problems.

08 Hours

**Course Outcomes:**

On completion of this course, students will be able to:

- Solve the ordinary differential equations as applied to various engineering applications.
- Solve the higher order linear differential equations using different methods
- Solve simultaneous first order differential equations, linear differential equations with variable coefficients and simple applications.
- Form and solve the partial differential equations with different methods
- Fit the curve and form the regression lines using the given data and determine different statistical coefficients.

**Text Books:**

1. Dr. B.S. Grewal, "Higher Engineering Mathematics"(Chapters 11-14,17,18,24, 25), Khanna Publishers, New Delhi, 43<sup>rd</sup> Edition, 2014, ISBN: 9788174091956.
2. N.P. Bali and Dr. Manish Goyal, "A Text Book of Engineering Mathematics" (Chapters 2, 7, 13,14,16,17,21), Laxmi Publications (P) Ltd, New Delhi, 9<sup>th</sup> Edition, 2014, ISBN: 9788131808320.

**Reference Books:**

1. Erwin Kreyszig "Advanced Engineering Mathematics", Wiley Pvt Ltd India, New Delhi, 9<sup>th</sup> Edition, 2011, ISBN 13: 9788126531356.
2. B.V. Ramana "Higher Engineering Mathematics", Tata McGraw – Hill Publishing Company Limited, New Delhi, 2007, ISBN -13: 978-0-07-063419-0.

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***SYLLABUS  
I & II SEM B.E.  
OUTCOME BASED  
EDUCATION  
CURRICULA***

**Scheme and Syllabus  
with effect from Academic year  
2018-19**

  
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***Syllabus: I & II Sem B.E.***

***Outcome Based Education Curricula***

***Scheme and Syllabus***

***With effect from Academic Year***

***2018-19***

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### Scheme of Study - First Semester – Physics Cycle

Sl. No	Course Code	Course	Teaching Dept.	L:T:P (Hrs/week)	Total Credits	Marks
1	18MAT11	Engineering Mathematics-I	MAT	3:2:0	4	100
2	18PHY12	Engineering Physics	PHY	3:0:0	3	100
3	18CEF13	Civil Engineering Foundation	CV	3:0:0	3	100
4	18CED14	Computer Aided Engineering Drawing	ME	2:0:4	4	100
5	18ELN15	Basic Electronics (IC)	EC	2:0:2	3	100
6	18PHL16	Engineering Physics Laboratory	PHY	1:0:2	2	100
7	18CSD17	Communication Skill Development -I	HSS	0:2:0	1	100
<b>Total</b>				<b>14:4:8</b>	<b>20</b>	<b>700</b>

### Scheme of Study - First Semester – Chemistry Cycle

Sl. No	Course Code	Course	Teaching Dept.	L:T:P (Hrs/week)	Total Credits	Marks
1	18MAT11	Engineering Mathematics-I	MAT	3:2:0	4	100
2	18CHE12	Engineering Chemistry (IC)	CHE	3:0:2	4	100
3	18CCP13	Computer Concepts and C Programming	CS/IS	3:0:0	3	100
4	18MEF14	Mechanical Engineering Foundation (IC)	ME	2:0:2	3	100
5	18ELE15	Basic Electrical Engineering (IC)	EC	2:0:2	3	100
6	18CPL16	Computer Programming Laboratory	CS/IS	1:0:2	2	100
7	18CSD17	Communication Skill Development-I	HSS	0:2:0	1	100
<b>Total</b>				<b>14:4:8</b>	<b>20</b>	<b>700</b>

IC – Integrated Course

L – Lecture

P-Practical

S – Self Study

T-Tutorials

### Scheme of Study – Second Semester – Physics Cycle

Sl. No	Subject Code	Subject	Teaching Dept.	L:T:P (Hrs/week)	Total Credits	Marks
1	18MAT21	Engineering Mathematics-II	MAT	3:2:0	4	100
2	18PHY22	Engineering Physics	PHY	3:0:0	3	100
3	18CEF23	Civil Engineering Foundation	CV	3:0:0	3	100
4	18CED24	Computer Aided Engineering Drawing (IC)	ME	2:0:4	4	100
5	18ELN25	Basic Electronics (IC)	EC	2:0:2	3	100
6	18PHL26	Engineering Physics Laboratory	PHY	1:0:2	2	100
7	18CSD27	Communication Skill Development-II	HSS	0:2:0	1	100
<b>Total</b>				<b>14:4:8</b>	<b>20</b>	<b>700</b>

### Scheme of Study - Second Semester – Chemistry Cycle

Sl. No	Course Code	Course	Teaching Dept.	L:T:P (Hrs/week)	Total Credits	Marks
1	18MAT21	Engineering Mathematics-II	MAT	3:2:0	4	100
2	18CHE22	Engineering Chemistry (IC)	CHE	3:0:2	4	100
3	18CCP23	Computer Concepts and C Programming	CS/IS	3:0:0	3	100
4	18MEF24	Mechanical Engineering Foundation (IC)	ME	2:0:2	3	100
5	18ELE25	Basic Electrical Engineering (IC)	EC	2:0:2	3	100
6	18CPL26	Computer Programming Laboratory	CS/IS	1:0:2	2	100
7	18CSD27	Communication Skill Development-II	HSS	0:2:0	1	100
<b>Total</b>				<b>14:4:8</b>	<b>20</b>	<b>700</b>

IC – Integrated Course

L – Lecture

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T-Tutorials

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**Module - V**

Definition, Laplace Transform(LT) of standard functions (Formula only), LT of  $e^{at} f(t)$  and  $\frac{f(t)}{t}$  (Formula only)- Problems, LT of periodic functions and unit step

functions (No theorems).

**Inverse Laplace Transforms:** Inverse Laplace Transforms of the form  $e^{-as} \bar{f}(s)$ , completing square, partial fractions, logarithmic and inverse functions. solution of Liner Differential Equations using Laplace Transform. **10 Hours**

**\*Convolution Theorem - Problems**

**Course Outcomes:**

On completion of this course, students will be able to:

- Solve the higher order differential equations.
- Solve engineering problems by using differential equations.
- Fit the curve using given data.
- Use double and triple integrals to determine the area and volume.
- Find the Laplace and inverse transforms of the real value functions and solve the Initial Value Problems using Laplace transforms.

**Text Books:**

1. Dr. B.S. Grewal: "Higher Engineering Mathematics", (Chapters 4,7,13,14,21,24,25), Khanna Publishers, New Delhi, 42<sup>nd</sup> Edition, 2012, ISBN: 9788174091956.
2. N.P. Bali and Dr. Manish Goyal: "A Text Book of Engineering Mathematics", (Chapters 5,7,9,11,12,30), Laxmi Publications (P) Ltd., New Delhi, 9<sup>th</sup> Edition, 2014, ISBN: 9788131808320.

**Reference Books:**

1. Erwin Kreyszig: "Advanced Engineering Mathematics"(Chapter: 2,3,6,10), Wiley Pvt. Ltd., India, New Delhi, 9<sup>th</sup> Edition, 2011, ISBN 13: 9788126531356.
2. B. V. Ramana: "Higher Engineering Mathematics" (Chapter: 2,6,13-15,18), TataMcGraw – Hill Publishing Company Limited, New Delhi, 2007, ISBN-13: 978-0-07-063419-0.
3. H.K. Dass and Er. Rajnish Verma: "Higher Engineering Mathematics", (Chapters 7-10,12-14,42,58,59), S. Chand and Company Private Limited, New Delhi, 3<sup>rd</sup> Edition, 2014, ISBN: 9788121938907.

**E-Resources:**

1. <http://bookboon.com/en/essential-engineering-mathematics-ebook>
2. <https://www.free-ebooks.net/ebook/essential-engineering-mathematics>

\*Self Study topics to be studied by students and the students have to submit a report to the department.

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**Syllabus: I & II Sem B.E.**  
**Outcome Based Education Curricula**

**Scheme and Syllabus**

**With effect from Academic Year**

**2017 -18**

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**Scheme of Study - First Semester – Physics Cycle**

Sl. No	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17MAT11	Engineering Mathematics-I	MAT	4-0-0-4	5	100
2	17PHY12	Engineering Physics	PHY	4-0-0-0	4	100
3	17CEF13	Civil Engineering Foundation	CV	4-0-0-4	5	100
4	17CED14	Computer Aided Engineering Drawing	ME	2-0-4-0	4	100
5	17ELN15	Basic Electronics (IC)	EC	3-0-2-0	4	100
6	17PHL16	Engineering Physics Laboratory	PHY	1-0-2-0	2	100
7	17ENV17	Environmental Studies	CHE/CV	1-0-0-0	1	100
8	17PDP18	Personality Development Programme	HSS	1-0-0-0	1	100
9	17ENG19	Functional English (Mandatory)	HSS	1-0-0-0	-	-
<b>Total</b>				<b>21-0-8-8</b>	<b>26</b>	<b>800</b>

**Scheme of Study - First Semester – Chemistry Cycle**

Sl. No	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17MAT11	Engineering Mathematics-I	MAT	4-0-0-4	5	100
2	17CHE12	Engineering Chemistry (IC)	CHE	4-0-2-0	5	100
3	17CCP13	Computer Concepts and C Programming	CS/IS	4-0-0-0	4	100
4	17MEF14	Mechanical Engineering Foundation (IC)	ME	3-0-2-0	4	100
5	17ELE15	Basic Electrical Engineering (IC)	EC	3-0-2-0	4	100
6	17CPL16	Computer Programming Laboratory	CS/IS	1-0-2-0	2	100
7	17CPH17	Constitution of India, Professional Ethics and Human Rights	HSS	1-0-0-0	1	100
8	17CSD18	Communication Skill Development	HSS	1-0-0-0	1	100
9	17KAN19	Kannada language (Mandatory)	HSS	1-0-0-0	-	-
<b>Total</b>				<b>22-0-8-4</b>	<b>26</b>	<b>800</b>

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study

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**Engineering Mathematics-II**

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
17MAT21	4:0:0:4	5	CIE:50 SEE:50	3 Hours	BS

**Course Objectives:**

This course will enable students to:

- Understand the application of mathematical skills in solving engineering problems.
- Understand the tracing of curves by analyzing the function and fit the curves for the given data.
- Understand the use of multiple integrals in finding area and volume of the different geometry.
- Understand the applications of Laplace Transforms in engineering problems.

**Syllabus****Module - I**

Linear differential equations with constant coefficients: Solution of second and higher order differential equations – By inverse differential operator method, Method of variations of parameter. Initial value and boundary value problems. 10 Hours

\*Initial value and boundary value problems

**Module - II**

Solution of simultaneous differential equations of first order. Linear differential equation with variable coefficients: Solution of Cauchy's and Legendre's Linear equations Application of Linear differential equations: Simple Harmonic motion, simple pendulum. 10 Hours

\* Application of Linear Differential Equations to LCR-Circuits.

**Module - III**

Curve fitting by the method of least square: Straight line, parabola and exponential curves, rank correlation, Correlation and regression lines. Tracing of curves: Cartesian and polar forms. 10 Hours

\* Tracing of curves in parametric form

**Module - IV**

Multiple integrals: Evaluation of double and triple integrals. Evaluation of double integrals by changing the order of integration and changing into polar coordinates. Beta and Gamma functions: Definition, relations and simple problems. Applications of double and triple integrals to find area and volume. 10 Hours

\* Applications of double and triple integrals to find area and volume.

**PRINCIPAL**

Nagarjuna College of Engineering & Technology  
434  
Devanahalli (Tq) Bengaluru (Dt.)-Pin: 562161

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**NAGARJUNA**  
**COLLEGE OF ENGINEERING & TECHNOLOGY**

An Autonomous College under VTU  
Bengaluru - 562 164

***SYLLABUS  
I & II SEM B.E.  
OUTCOME BASED  
EDUCATION  
CURRICULA***

**Scheme and Syllabus  
with effect from Academic year**

**PRINCIPAL**

Nagarjuna College of Engineering & Technology

**2016-17**

Devenahalli (Tal. Bengaluru) Dist. Bengaluru





**NAGARJUNA**

COLLEGE OF ENGINEERING & TECHNOLOGY

*Syllabus: I & II Sem B.E.  
Outcome Based Education Curricula*

**VISION**

Leadership and Excellence in Education.

**MISSION**

To fulfill the vision by imparting total quality education replete with the philosophy of blending human values and academic professionalism.

*Scheme and Syllabus  
With effect from Academic Year  
2016 -17*

**PRINCIPAL**

Nagarjuna College of Engineering & Technology  
Devanahalli (Tq) Bengaluru (Dt.)-Pin: 562104



**Scheme of Study - First Semester – Physics Cycle**

Sl. No	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16MAT11	Engineering Mathematics-I	MAT	4-0-0-4	5	100
2	16PHY12	Engineering Physics	PHY	4-0-0-0	4	100
3	16CEF13	Civil Engineering Foundation	CV	4-0-0-4	5	100
4	16CED14	Computer Aided Engineering Drawing	ME	2-0-4-0	4	100
5	16ELN15	Basic Electronics (IC)	EC	3-0-2-0	4	100
6	16PHL16	Engineering Physics Laboratory	PHY	1-0-2-0	2	100
7	16ENV17	Environmental Studies	CHE/CV	1-0-0-0	1	100
8	16PDP18	Personality Development Programme	HSS	1-0-0-0	1	100
9	16ENG19	Functional English (Mandatory)	HSS	1-0-0-0	-	-
Total				21-0-8-8	26	800

**Scheme of Study - First Semester – Chemistry Cycle**

Sl. No	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16MAT11	Engineering Mathematics-I	MAT	4-0-0-4	5	100
2	16CHE12	Engineering Chemistry (IC)	CHE	4-0-2-0	5	100
3	16CCP13	Computer Concepts and C Programming	CS/IS	4-0-0-0	4	100
4	16MEF14	Mechanical Engineering Foundation (IC)	ME	3-0-2-0	4	100
5	16ELE15	Basic Electrical Engineering (IC)	EC	3-0-2-0	4	100
6	16CPL16	Computer Programming Laboratory	CS/IS	1-0-2-0	2	100
7	16CPH17	Constitution of India, Professional Ethics and Human Rights	HSS	1-0-0-0	1	100
8	16CSD18	Communication Skill Development	HSS	1-0-0-0	1	100
9	16KAN19	Kannada language (Mandatory)	HSS	1-0-0-0	-	-
Total				22-0-8-4	26	800

IC – Integrated Course

P-Practical

L – Lecture

S – Self Study

T-Tutorials

**PRINCIPAL**

Nagarjuna College of Engineering &amp; Technology

Devanahalli (Ta) Bangalore (Ca) Pin: 562134

**Scheme of Study – Second Semester – Physics Cycle**

Sl. No	Subject Code	Subject	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16MAT21	Engineering Mathematics-II	MAT	4-0-0-4	5	100
2	16PHY22	Engineering Physics	PHY	4-0-0-0	4	100
3	16CEF23	Civil Engineering Foundation	CV	4-0-0-4	5	100
4	16CED24	Computer Aided Engineering Drawing	ME	2-0-4-0	4	100
5	16ELN25	Basic Electronics (IC)	EC	3-0-2-0	4	100
6	16PHL26	Engineering Physics Laboratory	PHY	1-0-2-0	2	100
7	16ENV27	Environmental Studies	CHE/CV	1-0-0-0	1	100
8	16PDP28	Personality Development Programme	HSS	1-0-0-0	1	100
9	16ENG29	Functional English (Mandatory)	HSS	1-0-0-0	-	-
Total				21-0-8-8	26	800

**Scheme of Study - Second Semester – Chemistry Cycle**

Sl. No	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16MAT21	Engineering Mathematics-II	MAT	4-0-0-4	5	100
2	16CHE22	Engineering Chemistry (IC)	CHE	4-0-2-0	5	100
3	16CCP23	Computer Concepts and C Programming	CS/IS	4-0-0-0	4	100
4	16MEF24	Mechanical Engineering Foundation (IC)	ME	3-0-2-0	4	100
5	16ELE25	Basic Electrical Engineering (IC)	EC	3-0-2-0	4	100
6	16CPL26	Computer Programming Laboratory	CS/IS	1-0-2-0	2	100
7	16CPH27	Constitution of India, Professional Ethics and Human Rights	HSS	1-0-0-0	1	100
8	16CSD28	Communication Skill Development	HSS	1-0-0-0	1	100
9	16KAN29	Kannada language (Mandatory)	HSS	1-0-0-0	-	-
Total				22-0-8-4	26	800

IC – Integrated Course

P-Practical

L – Lecture

S – Self Study

T-Tutorials

**PRINCIPAL**

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