Nagarjuna College of Engineering & Technology

(An Autonomous College Under VTU)

Mudugurki, VenkatagiriKote Post, Devanahalli, Bengaluru – 562110

Approved by A.I.C.T.E / NBA Accredited / Affiliated to VTU

Scheme for Electives offered during the AcademicYear 2016-17, 2017-18, 2018-19, 2019-20 and 2020-2021

Nagarjuna College of Engineering & Technologyin an Autonomous Institute under Visvesvaraya Technological University. The graduate attributes are as per Outcome Based Education (OBE)/ Choice Based Credit System (CBCS). The electives offered across the programmes included Foundation Electives, Engineering Electives and Open Electives. The electives were framed by considering Modern Technologies, Skill Development, Industrial orientated courses, Entrepreneurship Humanities and Social Sciences and Employability. The electivesoffered during the Academic Year 2016-17, 2017-18, 2018-19, 2019-20 and 2020-2021 are highlighted in Schemes of all Programmes.

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 to VIII Semesters

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

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)

PO1	**Engineering Knowledge:** Apply knowledge of mathematics and science, with fundamentals of Computer Science and Engineering to be able to solve complex engineering problems related to CSE.
PO2	**Problem Analysis:** Identify, Formulate, review research literature and analyze complex engineering problems related to CSE and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
PO3	**Design/ Development of solutions:** Design solutions for complex engineering problems related to CSE and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural societal and environmental considerations.
PO4	**Conduct Investigations of Complex problems:** Use research–based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern Tool Usage:** Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to computer science related complex engineering activities with an understanding of the limitations.

PO6	**The Engineer and Society:** Apply Reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the CSE professional engineering practice.
PO7	**Environment and Sustainability:** Understand the impact of the CSE professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply Ethical Principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and 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 engineering activities with the engineering community and with society at large such as able to comprehend and with write effective reports and design documentation, make effective presentations and give and receive clear instructions.
PO11	**Project Management and Finance:** Demonstrate knowledge and to one's own work, as a member and leader in a team, to manage projects and in multi disciplinary environments.
PO12	**Life-Long Learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning the broadest context of technological change.

Program Specific Outcome (PSOs)

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

Department of Computer Science & Engineering

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

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
		Total	**24**	**13: 10 :14 :0**			**900**	**5+31**

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

Department of Computer Science & Engineering

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

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
		Total	**25**	**16 :6 :12 : 0**			**800**	**5+31**
Note: Internship has to be completed compulsorily before VIII Semester								

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY
Department of Computer Science & Engineering
Outcome Based Education (OBE)/Choice Based Credit System (CBCS)
Fifth Semester B.E.- 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	Employability Skills and Aptitude Development	CSE/ISE	1:0:2:0	2	100
		Total			**26**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY
Department of Computer Science & Engineering
Outcome Based Education (OBE)/Choice Based Credit System (CBCS)
Sixth Semester B.E.- 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	Employability Skills and Aptitude Development	CSE/ISE/ECE/CIVIL	2:0:2:0	3	100
		Total			**27**	**900**

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, IITsetc.)

Open Elective -VIII

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

Department of Computer Science & Engineering

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

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
	Total			**17-0-14-8**	**26**	**900**

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

Department of Computer Science & Engineering

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

Eighth Semester B.E.- Scheme

Sl. No.	Course Code	Course Name	Teaching Dept.	Total Credits	Marks
1	17CSP81	Project Phase-II	CS	4	100
2	17CSP82	Project Phase-III	CS	4	100
3	17CSP83	Evaluation and Viva-voce (External)	CS	10	100
	Total			**18**	**300**

IC – Integrated Course **L – Lecture** **T-Tutorials**

P-Practical **S – Self Study**

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 to VIII Semesters

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

With effect from Academic Year

2019 - 20

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)

PO1	**Engineering Knowledge:** Apply knowledge of mathematics and science, with fundamentals of Computer Science and Engineering to be able to solve complex engineering problems related to CSE.
PO2	**Problem Analysis:** Identify, Formulate, review research literature and analyze complex engineering problems related to CSE and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
PO3	**Design/ Development of solutions:** Design solutions for complex engineering problems related to CSE and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural societal and environmental considerations.
PO4	**Conduct Investigations of Complex problems:** Use research–based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern Tool Usage:** Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to computer science related complex engineering activities with an understanding of the limitations.

PO6	**The Engineer and Society:** Apply Reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the CSE professional engineering practice.
PO7	**Environment and Sustainability:** Understand the impact of the CSE professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply Ethical Principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and 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 engineering activities with the engineering community and with society at large such as able to comprehend and with write effective reports and design documentation, make effective presentations and give and receive clear instructions.
PO11	**Project Management and Finance:** Demonstrate knowledge and to one's own work, as a member and leader in a team, to manage projects and in multi disciplinary environments.
PO12	**Life-Long Learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning the broadest context of technological change.

Program Specific Outcome (PSOs)

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

Department of Computer Science & Engineering

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

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)	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
		Total		**25**	**20:2:8:0**	**800**

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**

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

Department of Computer Science & Engineering

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

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
		Total		**25**	**21:0:8:0**	**800**

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

Department of Computer Science & Engineering

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

Fifth Semester B.E.- Scheme

Sl. No.	Course Code	Course Name	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17CST51	Computer Networks	CS	3-0-0-0	3	100
2	17CSI52	Microcontrollers (IC)	CS/EC	3-0-2-0	4	100
3	17CST53	Operating Systems	CS	3-0-0-0	3	100
4	17CST54	Software Engineering and Testing	CS	3-0-0-0	3	100
5	17CSI55X	Foundation Elective-IV (IC)	CS	3-0-2-0	4	100
6	17CST56X	Engineering Elective-V /PBL	CS	3-0-0-0	3	100
7	17CSL57	Computer Networks Laboratory	CS	1-0-2-0	2	100
8	17CSL58	Operating Systems Laboratory	CS	1-0-2-0	2	100
9	17CSH59	General Aptitude	CS/BS&H	2-0-0-0	2	100
		Total		**22-0-8-0**	**26**	**900**

Foundation Elective-IV (IC)

Sl. No.	Course Code	Course Name
1	17CSI551	Advanced Algorithms
2	17CSI552	Object Oriented Programming with JAVA
3	17CSI553	Computer Graphics

Engineering Elective-V / PBL

Sl. No.	Course Code	Course Name
1	17CST561	Operations Research
2	17CST562	Computer Forensics (MOOCS)
3	17CST563	The Data Scientist's Toolbox (Certificate Course) Johns Hopkins University

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

Department of Computer Science & Engineering

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

Sixth Semester B.E.- Scheme

Sl. No.	Course Code	Course Name	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	17CST61	Unix System Programming	CS	3-0-0-0	3	100
2	17CST62	System Software	CS	3-0-0-0	3	100
3	17CSI63	Embedded Systems (IC)	CS	3-0-2-0	4	100
4	17CSI64X	Foundation Elective-VI (IC)	CS	3-0-2-0	4	100
5	17CST65X	Engineering Elective-VII /PBL	CS	3-0-0-0	3	100
6	17HOE66X	Open Elective-VIII	CS/BS&H	2-0-0-4	3	100
7	17CSL67	Unix System Programming Laboratory	CS	1-0-2-0	2	100
8	17CSH68	Technical Aptitude and GD	CS/BS&H	2-0-0-0	2	100
9	17CSP69	Mini Project and Seminar	CS	1-0-2-0	2	100
		Total		**21-0-8-4**	**26**	**900**

Foundation Elective-VI (IC)

Sl. No.	Course Code	Course Name
1	17CSI641	Data Mining
2	17CSI642	Database Concepts
3	17CSI643	Soft Computing

Engineering Elective-VII / PBL

Sl. No.	Course Code	Course Name
1	17CST651	Artificial Intelligence
2	17CST652	Network Security (MOOCS)
3	17CST653	Operations Analytics (Certificate Course) Wharton University of Business

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

Department of Computer Science & Engineering

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

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
	Total			**17-0-14-8**	**26**	**900**

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)

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

Department of Computer Science & Engineering

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

Eigth 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
	Total			**18**	**300**

IC – Integrated Course **L – Lecture** **T-Tutorials**

P-Practical **S – Self Study**

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 to VIII Semesters

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

With effect from Academic Year

2018 - 19

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)

PO1	**Engineering Knowledge:** Apply knowledge of mathematics and science, with fundamentals of Computer Science and Engineering to be able to solve complex engineering problems related to CSE.
PO2	**Problem Analysis:** Identify, Formulate, review research literature and analyze complex engineering problems related to CSE and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
PO3	**Design/ Development of solutions:** Design solutions for complex engineering problems related to CSE and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural societal and environmental considerations.
PO4	**Conduct Investigations of Complex problems:** Use research–based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern Tool Usage:** Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to computer science related complex engineering activities with an understanding of the limitations.

PO6	**The Engineer and Society:** Apply Reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the CSE professional engineering practice.
PO7	**Environment and Sustainability:** Understand the impact of the CSE professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply Ethical Principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and 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 engineering activities with the engineering community and with society at large such as able to comprehend and with write effective reports and design documentation, make effective presentations and give and receive clear instructions.
PO11	**Project Management and Finance:** Demonstrate knowledge and to one's own work, as a member and leader in a team, to manage projects and in multi disciplinary environments.
PO12	**Life-Long Learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning the broadest context of technological change.

Program Specific Outcome (PSOs)

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

Department of Computer Science & Engineering

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

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
		Total		**20-2-10-0**	**26**	**900**

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** **T-Tutorials**

P-Practical **S – Self Study**

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

Department of Computer Science & Engineering

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

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
		Total		**20-2-10-0**	**26**	**900**

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**

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

Department of Computer Science & Engineering

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

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
		Total		**22-0-8-0**	**26**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

Department of Computer Science & Engineering

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

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
		Total		**21-0-8-4**	**26**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

Department of Computer Science & Engineering

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

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
	Total			**17-0-14-8**	**26**	**900**

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)

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

Department of Computer Science & Engineering

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

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
	Total			**18**	**300**

IC – Integrated Course **L – Lecture** **T-Tutorials**

P-Practical **S – Self Study**

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 to VIII Semesters

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

With effect from Academic Year

2017 - 18

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)

PO1	**Engineering Knowledge:** Apply knowledge of mathematics and science, with fundamentals of Computer Science and Engineering to be able to solve complex engineering problems related to CSE.
PO2	**Problem Analysis:** Identify, Formulate, review research literature and analyze complex engineering problems related to CSE and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
PO3	**Design/ Development of solutions:** Design solutions for complex engineering problems related to CSE and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural societal and environmental considerations.
PO4	**Conduct Investigations of Complex problems:** Use research–based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern Tool Usage:** Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to computer science related complex engineering activities with an understanding of the limitations.

PO6	**The Engineer and Society:** Apply Reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the CSE professional engineering practice.
PO7	**Environment and Sustainability:** Understand the impact of the CSE professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply Ethical Principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and 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 engineering activities with the engineering community and with society at large such as able to comprehend and with write effective reports and design documentation, make effective presentations and give and receive clear instructions.
PO11	**Project Management and Finance:** Demonstrate knowledge and to one's own work, as a member and leader in a team, to manage projects and in multi disciplinary environments.
PO12	**Life-Long Learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning the broadest context of technological change.

Program Specific Outcome (PSOs)

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

Department of Computer Science & Engineering

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

Third Semester B.E.- Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16CSM31	Engineering Mathematics-III (IC)	Mathematics	3-0-2-0	4	100
2	16CST32	Fundamentals of Computation Engineering	CSE	3-0-0-0	3	100
3	16CSI33	Data Structures with C (IC)	CSE	4-0-2-0	5	100
4	16CST34	Analog and Digital Electronics	CSE	3-0-0-0	3	100
5	16CST35	Computer Organization	CSE	3-0-0-0	3	100
6	16CSI36X	Foundation Elective-I (IC)	CSE	2-0-2-0	3	100
7	16CSL37	Analog and Digital Electronics Laboratory	CSE	1-0-2-0	2	100
8	16CSI38	Virtualization Foundations (IC)	CSE	1-0-2-0	2	100
9	16CSH39	Integrated Rural Development – Part 1	CSE	0-2-0-0	1	100
		Total		**20-2-10-0**	**26**	**900**

Foundation Elective-I (IC)

Sl. No.	Course Code	Course
1	16CSI361	Computer Communication and Networking
2	16CSI362	Creating Interactive and Responsive Web Pages
3	16CSI363	Principles of Programming

IC – Integrated Course **L – Lecture** **T-Tutorials**

P-Practical **S – Self Study**

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

Department of Computer Science & Engineering

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

Fourth Semester B.E.- Scheme

Sl. No.	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16CSM41	Engineering Mathematics-IV (IC)	Mathematics	3-0-2-0	4	100
2	16CST42	Formal Languages and Automata Theory	CSE	3-0-0-0	3	100
3	16CST43	Design and Analysis of Algorithms	CSE	3-0-0-0	3	100
4	16CSI44	Microprocessors (IC)	CSE	3-0-2-0	4	100
5	16CSI45X	Foundation Elective-II (IC)	CSE	3-0-2-0	4	100
6	16CST46X	Engineering Elective-III	CSE	3-0-0-0	3	100
7	16CSL47	Design and Analysis of Algorithms Laboratory	CSE	1-0-2-0	2	100
8	16CSI48	Cloud Computing Foundations (IC)	CSE	1-0-2-0	2	100
9	16CSH49	Integrated Rural Development – Part 2	CSE	0-2-0-0	1	100
		Total		**20-2-10-0**	**26**	**900**

Foundation Elective-II (IC)

Sl. No.	Course Code	Course
1	16CSI451	Unix and Shell Programming
2	16CSI452	Fundamentals of Multimedia
3	16CSI453	Introduction to Programming using Python

Engineering Elective-III

Sl. No.	Course Code	Course
1	16CST461	Introduction to Cyber Security and Cyber Laws
2	16CST462	Linear Integrated Circuits
3	16CST463	Control Systems

IC – Integrated Course **L – Lecture** **T-Tutorials**

P-Practical **S – Self Study**

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

Department of Computer Science & Engineering

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

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
		Total		**22-0-8-0**	**26**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

Department of Computer Science & Engineering

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

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
		Total		**21-0-8-4**	**26**	**900**

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

SCHEME OF TEACHING AND EXAMINATION

B.E. COMPUTER SCIENCE AND ENGINEERING

VII SEMESTER

S. No.	Subject Code	Subject	Teaching Dept.	Teaching Hrs / Week		Examination			
				Theory	Practical	Duration (Hrs)	Marks		
							IA	Exam	Total
1	10CS71	Object-Oriented Modeling and Design	CSE/ISE	04	-	03	25	100	125
2	10CS72/ 10IS752	Embedded Computing Systems	CSE/ISE	04	-	03	25	100	125
3	10CS73	Programming the Web	CSE/ISE	04	-	03	25	100	125
4	10CS74	Advanced Computer Architectures	CSE/ISE	04	-	03	25	100	125
5	10CS75x	Elective II (Group-B)	CSE/ISE	04	-	03	25	100	125
6	10CS76x	Elective III(Group-C)	CSE/ISE	04	-	03	25	100	125
7	10CSL77	Networks Laboratory	CSE/ISE	-	03	03	25	50	75
8	10CSL78	Web Programming Laboratory	CSE/ISE	-	03	03	25	50	75
Total				24	06	-	200	700	900

	Elective II – Group B		Elective III – Group C
10CS751/10IS751	Advanced DBMS	10CS761/10IS761	C# Programming and .Net
10CS752	Digital Signal Processing	10CS762/10IS762	Digital Image Processing
10CS753/10IS753	Java and J2EE	10CS763/10IS763	Game Theory
10CS754/10IS754	Multimedia Computing	10CS764/10IS764	Artificial Intelligence
10CS755/10IS74	Data Warehousing and Data Mining	10CS765/10IS765	Storage Area Networks
10CS756/10IS756	Neural Networks	10CS766/10IS766	Fuzzy Logic

SCHEME OF TEACHING AND EXAMINATION

B.E. COMPUTER SCIENCE AND ENGINEERING

VIII SEMESTER

S. No.	Subject Code	Subject	Teaching Dept.	Teaching Hrs / Week		Examination			
				Theory	Practical	Duration	Marks		
							IA	Exam	Total
1	10IS81	Software Architectures	CSE/ISE	04	-	03	25	100	125
2	10CS82	System Modeling and Simulation	CSE/ISE	04	-	03	25	100	125
3	10CS83x	Elective IV(Group-D)	CSE/ISE	04	-	03	25	100	125
4	10CS84x	Elective V(Group-E)	CSE/ISE	04	-	03	25	100	125
5	10CS85	Project Work	CSE		06	03	100	100	200
6	10CS86	Seminar	CSE	-	-	-	50	-	50
Total				16	06		250	500	750

Elective IV – Group D		**Elective V– Group E**	
10CS831/10IS831	Wireless Networks and Mobile Computing	10CS841/10IS841	Ad-hoc Networks
10CS832/10IS832	Web 2.0 and Rich Internet Applications	10CS842	Software Testing
10CS833	VLSI Design and Algorithms	10CS843	ARM Based System Design
10CS834/10IS834	Network Management Systems	10CS844/10IS844	Services Oriented Architecture
10CS835/10IS835	Information and Network Security	10CS845/10IS845	Clouds, Grids and Clusters
10CS836/10IS836	Microcontroller-Based Systems	10CS846	Multi-core Architecture and Programming

NOTE: Students have to register for one Elective from each of the five Elective Group.

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 to VIII Semesters

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

With effect from Academic Year

2016 - 17

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)

PO1	**Engineering Knowledge:** Apply knowledge of mathematics and science, with fundamentals of Computer Science and Engineering to be able to solve complex engineering problems related to CSE.
PO2	**Problem Analysis:** Identify, Formulate, review research literature and analyze complex engineering problems related to CSE and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
PO3	**Design/ Development of solutions:** Design solutions for complex engineering problems related to CSE and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural societal and environmental considerations.
PO4	**Conduct Investigations of Complex problems:** Use research–based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern Tool Usage:** Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to computer science related complex engineering activities with an understanding of the limitations.

PO6	**The Engineer and Society:** Apply Reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the CSE professional engineering practice.
PO7	**Environment and Sustainability:** Understand the impact of the CSE professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply Ethical Principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and 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 engineering activities with the engineering community and with society at large such as able to comprehend and with write effective reports and design documentation, make effective presentations and give and receive clear instructions.
PO11	**Project Management and Finance:** Demonstrate knowledge and to one's own work, as a member and leader in a team, to manage projects and in multi disciplinary environments.
PO12	**Life-Long Learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning the broadest context of technological change.

Program Specific Outcome (PSOs)

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

Department of Computer Science & Engineering

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

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**

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

Department of Computer Science & Engineering

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

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**

SCHEME OF TEACHING AND EXAMINATION

B.E. COMPUTER SCIENCE AND ENGINEERING

V SEMESTER

S. No.	Subject Code	Subject	Teaching Dept.	Teaching Hrs / Week		Examination			
				Theory	Practical	Duration (Hrs)	Marks		
							IA	Exam	Total
1	10IS51	Software Engineering	CSE/ISE	04	-	03	25	100	125
2	10CS52	Systems Software	CSE/ISE	04	-	03	25	100	125
3	10CS53	Operating Systems	CSE/ISE	04	-	03	25	100	125
4	10CS54	Database Management Systems	CSE/ISE	04	-	03	25	100	125
5	10CS55	Computer Networks - I	CSE/ISE	04	-	03	25	100	125
6	10CS56	Formal Languages and Automata Theory	CSE/ISE	04	-	03	25	100	125
7	10CSL57	Database Applications Laboratory	CSE/ISE	-	03	03	25	50	75
8	10CSL58	Systems Software & Operating Systems Laboratory	CSE/ISE	-	03	03	25	50	75
Total				24	06	-	200	700	900

SCHEME OF TEACHING AND EXAMINATION

B.E. COMPUTER SCIENCE AND ENGINEERING

VI SEMESTER

S. No.	Subject Code	Subject	Teaching Dept.	Teaching Hrs / Week		Examination			
				Theory	Practical	Duration (Hrs)	Marks		
							IA	Exam	Total
1	10AL61	Management and Entrepreneurship	CSE/ISE/ MBA	04	-	03	25	100	125
2	10CS62	Unix System Programming	CSE/ISE	04	-	03	25	100	125
3	10CS63/ 10IS662	Compiler Design	CSE/ISE	04	-	03	25	100	125
4	10CS64	Computer Networks - II	CSE/ISE	04	-	03	25	100	125
5	10CS65 / 10IS665	Computer Graphics and Visualization	CSE/ISE	04	-	03	25	100	125
6	10CS66x	Elective I (Group-A)	CSE/ISE	04	-	03	25	100	125
7	10CSL67	Computer Graphics and Visualization Laboratory	CSE/ISE	-	03	03	25	50	75
8	10CSL68	Unix System Programming and Compiler Design Laboratory	CSE/ISE	-	03	03	25	50	75
Total				24	06	-	200	700	900

Elective I – Group A

10CS661/10IS661	Operations Research
10CS662	Signals and Systems
10CS663/10IS663	Data Compression
10CS664/10IS664	Pattern Recognition
10CS665	Stochastic Models and Applications
10CS666/10IS666	Programming Languages

SCHEME OF TEACHING AND EXAMINATION

B.E. COMPUTER SCIENCE AND ENGINEERING

VII SEMESTER

S. No.	Subject Code	Subject	Teaching Dept.	Teaching Hrs / Week		Examination			
				Theory	Practical	Duration (Hrs)	Marks		
							IA	Exam	Total
1	10CS71	Object-Oriented Modeling and Design	CSE/ISE	04	-	03	25	100	125
2	10CS72/ 10IS752	Embedded Computing Systems	CSE/ISE	04	-	03	25	100	125
3	10CS73	Programming the Web	CSE/ISE	04	-	03	25	100	125
4	10CS74	Advanced Computer Architectures	CSE/ISE	04	-	03	25	100	125
5	10CS75x	Elective II (Group-B)	CSE/ISE	04	-	03	25	100	125
6	10CS76x	Elective III(Group-C)	CSE/ISE	04	-	03	25	100	125
7	10CSL77	Networks Laboratory	CSE/ISE	-	03	03	25	50	75
8	10CSL78	Web Programming Laboratory	CSE/ISE	-	03	03	25	50	75
Total				24	06	-	200	700	900

	Elective II – Group B		Elective III – Group C
10CS751/10IS751	Advanced DBMS	10CS761/10IS761	C# Programming and .Net
10CS752	Digital Signal Processing	10CS762/10IS762	Digital Image Processing
10CS753/10IS753	Java and J2EE	10CS763/10IS763	Game Theory
10CS754/10IS754	Multimedia Computing	10CS764/10IS764	Artificial Intelligence
10CS755/10IS74	Data Warehousing and Data Mining	10CS765/10IS765	Storage Area Networks
10CS756/10IS756	Neural Networks	10CS766/10IS766	Fuzzy Logic

SCHEME OF TEACHING AND EXAMINATION

B.E. COMPUTER SCIENCE AND ENGINEERING

VIII SEMESTER

S. No.	Subject Code	Subject	Teaching Dept.	Teaching Hrs / Week		Examination			
				Theory	Practical	Duration	Marks		
							IA	Exam	Total
1	10IS81	Software Architectures	CSE/ISE	04	-	03	25	100	125
2	10CS82	System Modeling and Simulation	CSE/ISE	04	-	03	25	100	125
3	10CS83x	Elective IV(Group-D)	CSE/ISE	04	-	03	25	100	125
4	10CS84x	Elective V(Group-E)	CSE/ISE	04	-	03	25	100	125
5	10CS85	Project Work	CSE		06	03	100	100	200
6	10CS86	Seminar	CSE	-	-	-	50	-	50
Total				16	06		250	500	750

Elective IV – Group D		**Elective V– Group E**	
10CS831/10IS831	Wireless Networks and Mobile Computing	10CS841/10IS841	Ad-hoc Networks
10CS832/10IS832	Web 2.0 and Rich Internet Applications	10CS842	Software Testing
10CS833	VLSI Design and Algorithms	10CS843	ARM Based System Design
10CS834/10IS834	Network Management Systems	10CS844/10IS844	Services Oriented Architecture
10CS835/10IS835	Information and Network Security	10CS845/10IS845	Clouds, Grids and Clusters
10CS836/10IS836	Microcontroller-Based Systems	10CS846	Multi-core Architecture and Programming

NOTE: Students have to register for one Elective from each of the five Elective Group.

Syllabus – III to VIII Semester B.E

NAGARJUNA
COLLEGE OF ENGINEERING & TECHNOLOGY

An Autonomous College under VTU

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

With effect from Academic Year 2020-21

DEPARTMENT OF CIVILENGINEERING

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

HOD Civil Engineering
Nagarjuna College of Engineering & Technology
Mudugurki Village, Venkatagirikote-Post
Devanahalli Taluk, Bengaluru -562 164

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.
- **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.

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

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 MaterialTestingLaboratory	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
TOTAL					**25**	**21:8:4:0**	**900**	**3+29**

BSC-Basic Science	**PCC – Professional Core**	**PEC – Professional Elective**	**MEP – Industrial Elective**	**HSMC – Humanity and Social Science**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

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
TOTAL					**25**	**20:6:4:0**	**900**	**3+29**
Internship is to be completed before VII Semester								

BSC-Basic Science	**PCC – Professional Core**	**PEC – Professional Elective**	**MEP – Industrial Elective**	**HSMC – Humanity and Social Science**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

Fifth Semester B.E. – Scheme

Sl. No	Course Code		Course Name	Teaching Dept.	Total Credits	L-T-P:S	Marks	Weekly Load
1	PCC	19CVT51	Design and Drawing of RCC Structures	CE	4	3-2-0-0	100	0+5
2	PCC	19CVT52	Structural Analysis-II	CE	3	2-2-0-0	100	0+5
3	PCC	19CVT53	Highway Engineering and Construction	CE	3	2-2-0-0	100	0+4
4	PEC	19CVT54	Construction Quality Management System (QA/QC)	CE	3	3-0-0-0	100	0+5
5	PCC	19CVT55	Foundation Engineering	CE	3	2-2-0-0	100	0+4
6	PEC	19CVT56X	Professional Elective – I	CE	3	3-0-0-0	100	0+3
7	PCC	19CVL57	Environmental Engineering Lab	CE	2	1-0-2-0	100	0+2
8	HSMC	19CVH58	Construction Management and Entrepreneurship	CE	3	3-0-0-0	100	2+1
9	HSMC	19CVH59	Environmental Studies	CE	1	1-0-0-0	100	1+0
Total					**25**	**20:8:2:0**	**900**	**3+29**
Internship is to be completed before VII Semester								

Professional Elective – I		
Sl. No	**Course Code**	**Course**
1	19 CVT 561	Basics of Structural Dynamics and Earthquake Resistant Design
2	19 CVT 562	Air pollution controlling and monitoring
3	19 CVT 563	Design of Masonry Structures

PCC – Professional Core	**PEC – Professional Elective**	**MEP – Industrial Elective**	**HSMC – Humanity and Social Science**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

Sixth Semester B.E. – Scheme

Sl. No	Course Code		Course	Teaching Dept.	Total Credits	L-T-P:S	Marks	Weekly Load
1	PCC	19CVT61	Design of Steel Structures	CE	4	3-2-0-0	100	0+5
2	PCC	19CVT62	Estimation and Quantity Surveying in Construction (QS)	CE	3	2-2-0-0	100	0+4
3	PCC	19CVT63	Construction planning Techniques (IC)	CE	4	3-2-0-0	100	0+6
4	PEC	19CVT64X	Professional Elective –II	CE	3	3-0-0-0	100	1+4
5	PEC	19CVT65X	Professional Elective –III	CE	3	3-0-0-0	100	1+4
6	MEP	19CVT66X	Industrial Elective-I	CE	3	3-0-0-0	100	1+4
7	PCC	19CVL67	Concrete and Highway Engineering Lab	CE	2	1-0-2-0	100	0+2
8	PCC	19CVP68	Extensive Survey project	CE	2	1-0-2-0	100	
9	P & T	19CVPT60	Placement Training	PT	1	1-0-0-0	100	0+2
Total					**25**	**20:6:4:0**	**900**	**3+31**
Internship is to be completed before VII Semester								

Professional Elective–II		
Sl. No	**Course Code**	**Course**
1	19 CVT 641	Traffic Engineering and Management
2	19 CVT 642	Remote sensing and GIS
3	19 CVT 643	Sub Surface Exploration and Ground Improvement Techniques

Professional Elective–III		
Sl. No	**Course Code**	**Course**
1	19 CVT 651	Repair and Rehabilitation of Concrete structures
2	19 CVT 652	Advanced design of temporary structure
3	19 CVT 653	Solid waste Management

Industrial Elective – I		
Sl. No	**Courses Code**	**Course Name**
1	19CVT661	Construction joints and water proofing
2	19 CVT 662	Construction Safety and industrial policies
3	19 CVT 663	Natural Disaster Mitigation and Management

PCC – Professional Core	**PEC – Professional Elective**	**MEP – Industrial Elective**	**HSMC – Humanity and Social Science**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

Seventh Semester B E Scheme

Sl. No	Subject Code		Subject	Teaching Dept.	L-T-P-S	Total Credits	Marks	Weekly load
1	PCC	19 CVT71	Bridge Engineering	CE	2-2-0-0	3	100	1+5
2	PCC	19 CVT72	Pre Stressed Concrete Structures	CE	2-2-0-0	3	100	0+5
3	PEC	19CVT73X	Professional Elective – IV	CE	3-0-0-0	3	100	1+3
4	MEP	19 CVT74X	Industrial Electives- II	CE	3-0-0-0	3	100	0+5
5	MEP	19 CVT75X	Industrial Electives- III	CE	3-0-0-0	3	100	1+3
6	PCC	19 CVL76	Geotechnical Engineering Lab	CE	1-0-2-0	2	100	0+2
7	PCC	19 CVL77	Software Application Lab	CE	0-0-2-0	2	100	0+4
8	PCC	19CVP78	Project Phase -I	CE	0-0-0-2	1	100	0+2
9	Placement Drive (NCET, Job Mela)			CE				
Total					**14:4:4:2**	**20**	**800**	**3+29**

Professional Elective - IV		
Sl. No	**Courses Code**	**Course**
1	19 CVT 731	Railways, Harbor, Airport and Tunnel Engineering
2	19 CVT 732	Advanced Concrete Technology
3	19 CVT 733	Energy efficient and Green Buildings

Industrial Elective - II		
Sl. No	**Courses Code**	**Course**
1	19CVT 741	Analysis and Design of Tall Structures
2	19 CVT 742	Computational Structural Mechanics
3	19 CVT 743	Advanced Design of Steel Structures

Industrial Elective - III		
Sl. No	**Courses Code**	**Course**
1	19 CVT751	Alternative Building Materials And Technologies
2	19 CVT 752	Industrial wastewater treatment
3	19 CVT 753	Rural water supply and sanitation

PCC – Professional Core	**PEC – Professional Elective**	**MEP – Industrial Elective**	**HSMC – Humanity and Social Science**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

Eighth Semester B E Scheme

S. No.	Course Code	Course Name	Total Credits	Marks
1.	19CVP81	Internship	3	100
2.	19CVP82	Project Phase-II	3	100
3.	19CVP83	Project Phase-III	4	100
4.	19CVP84	Project Evaluation and Viva voce (External)	4	100
5.	19CVP85	Technical Seminar	1	100
6.	AICTE Activity points (Mandatory)			
Total			**15**	**500**

PCC – Professional Core	PEC – Professional Elective	MEP – Industrial Elective	HSMC – Humanity and Social Science

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

NAGARJUNA COLLEGE OF ENGG. & TECH. * BENGALURU *

NAGARJUNA

COLLEGE OF ENGINEERING & TECHNOLOGY

An Autonomous College under VTU

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

With effect from Academic Year 2019-20

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 techniquesusing modern engineering tools for designing, modeling and analyzing the societal and environmental problems.

M3: Developing Communication skill, leadership qualities through teamwork andskills 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 theiremployability and entrepreneurship skills.

24/06/19

HOD Civil Engineering
Nagarjuna College of Engineering & Technology
Mudugurki Village, Venkatagirikote-Post
Devanahalli Taluk, Bengaluru -562 164

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 forenvironmental protection.

- **PEO4:** Civil Engineering graduates will becapable 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 ofcomplex 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 environmentalconsiderations.

- **PO-4**: Conduct Investigations of Complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation ofdata 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 professionalCivil 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 forsustainable 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 toone's own work, as a member and leader in a team, to manage Civil Engineering projectsand in multidisciplinary environments.

- **PO-12:** Life Long Learning: Recognize theneed for, and have the preparation and ability to engage in independent and life-longlearning 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.

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

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** **T-Tutorials**

P-Practical **S – Self Study**

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

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
TOTAL				**25**	**21:2:6:0**	**800**

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**

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

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)

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

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

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)

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**

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

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)

Open Elective - XI		
Sl. No	**Courses Code**	**Course**
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

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

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

NAGARJUNA COLLEGE OF ENGINEERI

DEPARTMENT OF CIVIL ENGI

Outcome Based Education (OBE)/ Choice Base

Eighth Semester B E Sche

Sl. No	Subject Code	Subject	Teaching Department
1	18CVI81	Professional Practice / Internship	CE
2	18CVP82	Project Phase – II & III	CE
3	18CVP83	Evaluation and Viva Voce (External)	CE
4	18CVS84	Technical Seminar	CE
		Total	

IC – Integrated Course	L - Lecture	T - Tutorials	

NAGARJUNA COLLEGE OF ENGG. & TECH. * BENGALURU *

NAGARJUNA

COLLEGE OF ENGINEERING & TECHNOLOGY

An Autonomous College under VTU

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

With effect from Academic Year 2018-19

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 techniquesusing modern engineering tools for designing, modeling and analyzing the societal and environmental problems.

M3: Developing Communication skill, leadership qualities through teamwork andskills 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 theiremployability and entrepreneurship skills.

Nagendra

HOD Civil Engineering
Nagarjuna College of Engineering & Technology
Mudugurki Village, Venkatagirikote-Post
Devanahalli Taluk, Bengaluru -562 164

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 forenvironmental protection.

- **PEO4:** Civil Engineering graduates will becapable 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 ofcomplex 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 environmentalconsiderations.

- **PO-4**: Conduct Investigations of Complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation ofdata 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 professionalCivil 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 forsustainable 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 toone's own work, as a member and leader in a team, to manage Civil Engineering projectsand in multidisciplinary environments.

- **PO-12**: Life Long Learning: Recognize theneed for, and have the preparation and ability to engage in independent and life-longlearning 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.

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

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)	Mathemat-ics	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 Lab-oratory	CE	1-0-2-0	2	100
8	17CVL38	Surveying Practice-I	CE	1-0-2-0	2	100
9	17CVH39	Integrated Rural Develop-ment – 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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

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)	Mathemat-ics	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
Total				**21-2-8-0**	**26**	**900**

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**

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

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
Total				**22:0:8:0**	**26**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

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
Total				**21:0:8:4**	**26**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

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
Total				**18-0-12-8**	**26**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

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
		Total		**18**	**300**

IC – Integrated Course L – Lecture T-Tutorials

P-Practical S – Self Study

NAGARJUNA COLLEGE OF ENGG. & TECH. * BENGALURU *

NAGARJUNA

COLLEGE OF ENGINEERING & TECHNOLOGY

An Autonomous College under VTU

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

With effect from Academic Year 2017-18

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 techniquesusing modern engineering tools for designing, modeling and analyzing the societal and environmental problems.

M3: Developing Communication skill, leadership qualities through teamwork andskills 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 theiremployability and entrepreneurship skills.

HOD Civil Engineering
Nagarjuna College of Engineering & Technology
Mudugurki Village, Venkatagirikote-Post
Devanahalli Taluk, Bengaluru -562 164

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 forenvironmental protection.

- **PEO4**: Civil Engineering graduates will becapable 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

NAGARJUNA COLLEGE OF ENGG. & TECH. * BENGALURU *

appropriate consideration for the public health and safety, cultural, societal and environmentalconsiderations.

- **PO-4**: Conduct Investigations of Complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation ofdata 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 professionalCivil 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 forsustainable 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 toone's own work, as a member and leader in ateam, to manage Civil Engineering projectsand in multidisciplinary environments.

- **PO-12**: Life Long Learning: Recognize theneed for, and have the preparation and ability to engage in independent and life-longlearning 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.

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

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
Total				**21-2-8-0**	**26**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

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
Total				21-2-8-0	26	900

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**

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

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
Total				**22:0:8:0**	**26**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

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
Total				**21:0:8:4**	**26**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

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
Total				**18-0-12-8**	**26**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

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
		Total		18	300

IC – Integrated Course L – Lecture T-Tutorials

P-Practical S – Self Study

NAGARJUNA

COLLEGE OF ENGINEERING & TECHNOLOGY

An Autonomous College under VTU

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

With effect from Academic Year 2016-17

DEPARTMENT OF CIVIL ENGINEERING

VISION

To transform the students as leaders in CivilEngineering 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 theiremployability and entrepreneurship skills.

HOD Civil Engineering
Nagarjuna College of Engineering & Technology
Mudugurki Village, Venkatagirikote Post
Devanahalli Taluk, Bangaluru -562 164

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 becapable 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

environmentalconsiderations.

- **PO-4**: Conduct Investigations of Complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation ofdata 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 professionalCivil 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 forsustainable 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.

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

Third Semester B.E. – Scheme

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**

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

Third Semester B.E. – Scheme

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

Third Semester B.E. – Scheme

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
Total				**21-0-8-4**	**26**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

Third Semester B.E. – Scheme

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
Total				**18-0-12-8**	**26**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

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

Third Semester B.E. – Scheme

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
		Total		18	300

IC – Integrated Course L – Lecture T-Tutorials

P-Practical S – Self Study

NAGARJUNA COLLEGE OF ENGG. & TECH. * BENGALURU *

NAGARJUNA
COLLEGE OF ENGINEERING & TECHNOLOGY

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

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

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 ENGINEERING
Outcome Based Education(OBE)/ Choice Based Credit System(CBCS)

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
TOTAL				**19-4-8**	**25**	**900**

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
Outcome Based Education(OBE)/ Choice Based Credit System(CBCS)

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	**19UHV47**	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
TOTAL				**18-6-8**	**25**	**900**

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
Outcome Based Education(OBE)/ Choice Based Credit System(CBCS)

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
TOTAL				**19-4-8**	**25**	**900**

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 ENGINEERING
Outcome Based Education(OBE)/ Choice Based Credit System(CBCS)

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
TOTAL				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

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

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 andSeminar	EC	0-0-6-0	3	100
Total				**18-0-12-8**	**26**	**900**

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
4	17ECT744	Advanced C Programming and Data Structures
5	17ECT745	Introduction to Embedded System and C Programming

6	17ECT756	Advanced JAVA with Fullstack

Open Elective-XII

Sl. No.	Course Code	Course
1	17HOE751	Tax Management
2	17HOE752	Assessment of Building Energy Performance (Of-fered by ASHRAE)
3	17HOE753	Crisis Management
4	17HOE754	Online certification courses from IITs / IISC /SWAYAM / EDX
5	17HOE755	Automotive Embedded System Design
6	17HOE756	Advanced Embedded Systems
7	17HOE757	Advanced JAVA

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	17HOE764	Online certification courses from IITs / IISC /SWAYAM / EDX
5	17HOE765	Model Based Design using MATLAB
6	17HOE766	Introduction to ARMs processor and its Applications
7	17HOE767	Advanced python

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
Outcome Based Education(OBE)/ Choice Based Credit System(CBCS)

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
Total				**18**	**300**

IC – Integrated Course **L – Lecture** **T-Tutorials**

P-Practical **S – Self Study**

NAGARJUNA
COLLEGE OF ENGINEERING & TECHNOLOGY

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

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

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 ENGINEERING
Outcome Based Education(OBE)/ Choice Based Credit System(CBCS)

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
TOTAL				**20-2-8-0**	**25**	**800**

Foundation Elective – I (IC)

SI. 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 ENGINEERING
Outcome Based Education(OBE)/ Choice Based Credit System(CBCS)

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
TOTAL				**20-2-8-0**	**25**	**800**

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 ENGINEERING
Outcome Based Education(OBE)/ Choice Based Credit System(CBCS)

Fifth Semester B.E.-Scheme

Sl. No.	Course Code	Course	TeachingDept.	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
Total				**22-0-8-0**	**26**	**900**

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 ENGINEERING

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

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	EngineeringElective-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
Total				**20-0-10-4**	**26**	**900**

Foundation Elective-VII (IC)

SI. 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

SI. 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 ENGINEERING

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

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 andSeminar	EC	0-0-6-0	3	100
Total				**18-0-12-8**	**26**	**900**

Foundation Elective-X (IC)

SI. 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

SI. No.	Course Code	Course
1	16ECT741	Wireless Communication
2	16ECT742	Artificial Intelligence
3	16ECT743	MEMS
4	16ECT744	Advanced C Programming and Data Structures
5	16ECT745	Introduction to Embedded System and C Programming
6	16ECT756	Advanced JAVA with Fullstack

Open Elective-XII

SI. 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
5	16HOE755	Automotive Embedded System Design
6	16HOE756	Advanced Embedded Systems
7	16HOE757	Advanced JAVA

Open Elective-XIII

SI. No.	Course Code	Course
1	16HOE761	Small & Medium Enterprise Management
2	16HOE762	Occupational Safety & Health Administration
3	16HOE763	Animation & Multimedia Engineering
4	16HOE764	Online certification courses from IITs / IISC /SWAYAM / EDX
5	16HOE765	Model Based Design using MATLAB
6	16HOE766	Introduction to ARMs processor and its Applications
7	16HOE767	Advanced python

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

Eigthth 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
Total				**18**	**300**

NAGARJUNA
COLLEGE OF ENGINEERING & TECHNOLOGY

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

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

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.

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 ENGINEERING
Outcome Based Education(OBE)/ Choice Based Credit System(CBCS)

Third Semester B.E.-Scheme

Sl. No.	Course Code	Course	Teaching Dept.	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 Circuits Laboratory	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
		TOTAL		**20-2-8-0**	**26**	**900**

Foundation Elective–I (IC)

SI. 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 ENGINEERING
Outcome Based Education(OBE)/ Choice Based Credit System(CBCS)

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 Develop-ment – Part 2	EC	0-2-0-0	1	100
TOTAL				**21-2-8-0**	**26**	**900**

Foundation Elective-II (IC)

SI. No	Course Code	Course
1	17ECI451	Linear Integrated Circuits
2	17ECI452	Fundamentals of VLSI
3	17ECI453	Introduction to Programming using Python

Engineering Elective-III

SI. 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 ENGINEERING
Outcome Based Education(OBE)/ Choice Based Credit System(CBCS)

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
Total				**22-0-8-0**	**26**	**900**

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 ENGINEERING
Outcome Based Education(OBE)/ Choice Based Credit System(CBCS)

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
Total				**20-0-10-4**	**26**	**900**

Foundation Elective-VII (IC)

SI. 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

SI. 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 ENGINEERING

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

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
Total				**18-0-12-8**	**26**	**900**

Foundation Elective-X (IC)

SI. 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

SI. No.	Course Code	Course
1	15ECT741	Wireless Communication
2	15ECT742	Artificial Intelligence
3	15ECT743	MEMS
4	15ECT744	Advanced C Programming and Data Structures
5	15ECT745	Introduction to Embedded System and C Programming
6	15ECT756	Advanced JAVA with Fullstack

Open Elective-XII

SI. 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
5	15HOE755	Automotive Embedded System Design
6	15HOE756	Advanced Embedded Systems
7	15HOE757	Advanced JAVA

Open Elective-XIII

SI. No.	Course Code	Course
1	15HOE761	Small & Medium Enterprise Management
2	15HOE762	Occupational Safety & Health Administration
3	15HOE763	Animation & Multimedia Engineering
4	15HOE764	Online certification courses from IITs / IISC /SWAYAM / EDX
5	15HOE765	Model Based Design using MATLAB
6	15HOE766	Introduction to ARMs processor and its Applications
7	15HOE767	Advanced python

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

Eigthth 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
Total				**18**	**300**

NAGARJUNA
COLLEGE OF ENGINEERING & TECHNOLOGY

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

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

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 ENGINEERING
Outcome Based Education(OBE)/ Choice Based Credit System(CBCS)

Third Semester B.E.-Scheme

Sl. No	Course Code	Course	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
1	16ECM31	EngineeringMathematics-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
TOTAL				**20-2-8-0**	**26**	**900**

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 ENGINEERING
Outcome Based Education(OBE)/ Choice Based Credit System(CBCS)

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
TOTAL				**21-2-8-0**	**26**	**900**

Foundation Elective-II (IC)

SI. No	Course Code	Course
1	16ECI451	Linear Integrated Circuits
2	16ECI452	Fundamentals of VLSI
3	16ECI453	Introduction to Programming using Python

Engineering Elective-III

SI. 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 & TECHNOLOGY
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
Outcome Based Education(OBE)/ Choice Based Credit System(CBCS)

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
Total				**22-0-8-0**	**26**	**900**

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 ENGINEERING

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

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
Total				**20-0-10-4**	**26**	**900**

Foundation Elective-VII (IC)

SI. 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

SI. 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 & 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	**Elective-II (Group B)**	EC	4	-	3	25	100	125
6	10EC76x	**Elective-III (Group C)**	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
TOTAL				**24**	**06**	**24**	**200**	**700**	**900**

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

Eigthth 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
TOTAL				**16**	**09**	**15**	**250**	**500**	**750**

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

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

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

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.

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 ENGINEERING

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

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
TOTAL				**20-2-8-0**	**26**	**900**

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 ENGINEERING
Outcome Based Education(OBE)/ Choice Based Credit System(CBCS)

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
TOTAL				**21-2-8-0**	**26**	**900**

Foundation Elective-II (IC)

SI. No	Course Code	Course
1	15ECI451	Linear Integrated Circuits
2	15ECI452	Fundamentals of VLSI
3	15ECI453	Introduction to Programming using Python

Engineering Elective-III

SI. 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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY DEPARTMENT OF ELECTRONICS & 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
TOTAL				**24**	**06**	**24**	**200**	**700**	**900**

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	**Elective-I (Group A)**	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
TOTAL				**24**	**06**	**24**	**200**	**700**	**900**

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	**Elective-II (Group B)**	EC	4	-	3	25	100	125
6	10EC76x	**Elective-III (Group C)**	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
TOTAL				**24**	**06**	**24**	**200**	**700**	**900**

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

Eigthth 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
TOTAL				**16**	**09**	**15**	**250**	**500**	**750**

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

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
Devanahalli (Tq) Bengaluru (Dt.)-Pin: 562164

NAGARJUNA

COLLEGE OF ENGINEERING & TECHNOLOGY

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
		Total	**24**	**13: 10 :14 :0**			**900**	**5+31**

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

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
		Total	**25**	**16 :6 :12 : 0**			**800**	**5+31**
Note: Internship has to be completed compulsorily before VIII Semester								

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
		Total			**26**	**900**

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
		Total			**27**	**900**

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

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

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
	Total			**17-0-14-8**	**26**	**900**

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)

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,
Bangalore district - 562 164

NAGARJUNA
COLLEGE OF ENGINEERING & TECHNOLOGY

An Autonomous College under VTU

DEPARTMENT OF INFORMATION SCIENCE & ENGINEERING

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	SoftwareEngineeringandTesting	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
TOTAL				22:0:8:0	26	900

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
Total				22:0:6:4	26	900

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	17IS173X	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
		Total		18:0:12:8	26	900

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
		Total		18	300

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

Choice Based Credit System (CBCS)

Outcome Based Education Curriculum

2018-2019

Department of Information 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 INFORMATION SCIENCE & ENGINEERING

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 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	SoftwareEngineeringandTesting	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
TOTAL				22-0-8-0	26	900

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
Total				22-0-6-4	26	900

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
		Total		18-0-12-8	26	900

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
		Total		18	300

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

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,
Bangalore district - 562 164

NAGARJUNA

COLLEGE OF ENGINEERING & TECHNOLOGY

An Autonomous College under VTU

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:

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.	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
		Total		**25**	**20:2:8:0**	**800**

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
		Total		**25**	**21:0:8:0**	**800**

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	SoftwareEngineeringandTesting	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
TOTAL				22:0:8:0	26	900

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
Total				22:0:6:4	26	900

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	17IS73X	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
		Total		18:0:12:8	26	900

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
		Total		18	300

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

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

NAGARJUNA

COLLEGE OF ENGINEERING & TECHNOLOGY

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 Computatio –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
TOTAL				19-2-10-4	26	900

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
TOTAL				20-2-10-0	26	900

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	SoftwareEngineeringandTesting	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
TOTAL				22-0-8-0	26	900

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
Total				22-0-6-4	26	900

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	15IS73X	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
		Total		18-0-12-8	26	900

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
		Total		18	300

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

Choice Based Credit System (CBCS)

Outcome Based Education Curriculum

2015-2016

Department of Information 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

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

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.
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	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	2-0-2-0	3	100
7	15ISL37	Analog and Digital Electronics Laboratory	ISE	1-0-2-0	2	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

Choice Based Credit System (CBCS)

Outcome Based Education Curriculum

2019-2020

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

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 to VIII Semesters

Outcome Based Education (OBE)/ Choice Based Credit System (CBCS) Curricula With effect from Academic Year 2019-20

Program Educational Objectives (PEOs)

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 and Program SpecificOutcomes as defined by the Program

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 conclu- sions using first principles of mathematics and engineering sciences.
PO3	**Design/Development of solutions:** Design solutions for complex Mechani- cal 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 consider- ations.
PO4	**Conduct investigations of complex problems:** Use research-based knowl- edge 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 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 Mechanical 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 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	**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 Mechanical Engineering by applying the fundamental knowledge of Mechanical engineering.

PSO2. Graduate will demonstrate an ability to investigate, design and develop both software and hardware using significant knowledge of modern tools in Mechanical 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 ENGINEERING
Outcome Based Education(OBE)/ Choice Based Credit System(CBCS)

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
Total				**25**	**21:0:8:0**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
Outcome Based Education(OBE)/ Choice Based Credit System(CBCS)

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	19MET44X	Professional Elective - II	ME	3	3:0:0:0	100
5	19MET45X	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
Total Credits				**25**	**21:0:8:0**	**1000**

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

Sl. No.	Course Code	Course Name	Total Credits	Marks
1	19MET451	Renewable Energy Resources	3	100
2	19MET452	Management Information System	3	100
3	19MET453	Environmental Air Pollution	3	100

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
Outcome Based Education(OBE)/ Choice Based Credit System(CBCS)

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
Total				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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
Outcome Based Education(OBE)/ Choice Based Credit System(CBCS)

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
Total				**25**	**24:2:0:0**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
Outcome Based Education(OBE)/ Choice Based Credit System(CBCS)

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
Total				**18**	**16:4:0:0**	**700**

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 Systems	3	100
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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
Outcome Based Education(OBE)/ Choice Based Credit System(CBCS)

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
	TOTAL			**16**	**400**

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.

III to VIII Semesters

Outcome Based Education (OBE)/ Choice Based Credit System (CBCS) Curricula With effect from Academic Year 2018-19

Program Educational Objectives (PEOs)

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 and Program SpecificOutcomes as defined by the Program

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 conclu- sions using first principles of mathematics and engineering sciences.
PO3	**Design/Development of solutions:** Design solutions for complex Mechani- cal 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 consider- ations.
PO4	**Conduct investigations of complex problems:** Use research-based knowl- edge 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 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 Mechanical 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 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	**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 Mechanical Engineering by applying the fundamental knowledge of Mechanical engineering.

PSO2. Graduate will demonstrate an ability to investigate, design and

develop both software and hardware using significant knowledge of modern tools in Mechanical 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 ENGINEERING

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

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
Total				**19-2-12-0**	**26**	**900**

Foundation Elective-I

Sl. No.	Courses Code	Course
1	18MET361	Automobile Engineering-I

2	18MET362	Engineering Metallurgy
3	18MET363	Industrial Pollution Control

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

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
Total				**21-2-8-0**	**26**	**900**

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	18MET462	Object Oriented Programming using C++

		Science		
3	18MET453	Air Pollution and Control	18MET463	Management Information System
4			18MET464	Smart Materials

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

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
Total				**22-0-8-0**	**26**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

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
Total				**21-0-8-4**	**26**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

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
Total				**19-0-10-8**	**26**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

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
Total				**18**	**300**

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.

III to VIII Semesters

Outcome Based Education (OBE)/ Choice Based Credit System (CBCS) Curricula With effect from Academic Year 2017-18

Program Educational Objectives (PEOs)

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 and Program SpecificOutcomes as defined by the Program

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 conclu- sions using first principles of mathematics and engineering sciences.
PO3	**Design/Development of solutions:** Design solutions for complex Mechani- cal 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 consider- ations.
PO4	**Conduct investigations of complex problems:** Use research-based knowl- edge 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 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 Mechanical 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 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	**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 Mechanical Engineering by applying the fundamental knowledge of Mechanical engineering.

PSO2. Graduate will demonstrate an ability to investigate, design and develop both software and hardware using significant knowledge of modern tools in Mechanical 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 ENGINEERING

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

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	17MET36X	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
Total				**19-2-12-0**	**26**	**900**

Foundation Elective-I

Sl. No.	Courses Code	Course
1	17MET361	Automobile Engineering-I
2	17MET362	Engineering Metallurgy
3	17MET363	Industrial Pollution Control

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

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	17MET45X	Foundation Elective-II	ME	3-0-0-0	3	100
6	17MET46X	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
Total				**21-2-8-0**	**26**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

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
Total				**22-0-8-0**	**26**	**900**

Foundation Elective-III

Sl. No.	Course Code	Course
1	17MET551	Composite Material Technology
2	17MET552	Power Plant Engineering
3	17MET553	HVAC-I

Engineering Elective-II

Sl. No.	Course Code	Course
1	17MET561	Metal Forming Process

2	17MET562	Mechatronics
3	17MET563	Economics of Engineering

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

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
Total				**21-0-8-4**	**26**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

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
Total				**19-0-10-8**	**26**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

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
Total				**18**	**300**

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.

III to VIII Semesters

Outcome Based Education (OBE)/ Choice Based Credit System (CBCS) Curricula With effect from Academic Year 2016-17

Program Educational Objectives (PEOs)

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 and Program SpecificOutcomes as defined by the Program

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 conclu- sions using first principles of mathematics and engineering sciences.
PO3	**Design/Development of solutions:** Design solutions for complex Mechani- cal 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 consider- ations.
PO4	**Conduct investigations of complex problems:** Use research-based knowl- edge 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 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 Mechanical 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 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	**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 ENGINEERING

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

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	16MET35X	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
Total				**25**	**19:2:10:0**	**800**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

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	16MET44X	Foundation Elective - II	ME	4	4:0:0:0	100
5	16MET45X	Engineering Elective - III	ME	4	4:0:0:0	100
6	16MEL46	Machine Shop Laboratory	ME	2	1:0:2:0	100
7	16MEH47	Career Skill Development Programme	ME	2	1:2:0:0	100
8	16CPH48	Constitution of India, Professional Ethics and Human Rights	H&S	1	1:0:0:0	100
Total				**25**	**21:2:6:0**	**800**

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	1E6ET451	Renewable Energy Resources

2	16EET452	Introduction to Cyber Security and Cyber Laws
3	16EET453	Management Information System
4	16EET454	Environmental Air Pollution

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

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 AndRobotics	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 Labora-tory	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
Total				**22-0-8-0**	**26**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

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
Total				**21-0-8-4**	**26**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

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 Modellingand 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
Total				**19-0-10-8**	**26**	**900**

Foundation Elective-IX

Sl. No.	Subject 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 hoursapproved 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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

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
Total				**18**	**300**

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.

III to VIII Semesters

Outcome Based Education (OBE)/ Choice Based Credit System (CBCS) Curricula With effect from Academic Year 2015-16

Program Educational Objectives (PEOs)

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 and Program SpecificOutcomes as defined by the Program

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 conclu- sions using first principles of mathematics and engineering sciences.
PO3	**Design/Development of solutions:** Design solutions for complex Mechani- cal 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 consider- ations.
PO4	**Conduct investigations of complex problems:** Use research-based knowl- edge 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 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 Mechanical 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 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	**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 ENGINEERING

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

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	15MET35X	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
Total				**25**	**19:2:10:0**	**800**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

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
Total				**25**	**21:2:6:0**	**800**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

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 AndRobotics	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 Labora-tory	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
Total				**22-0-8-0**	**26**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

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
Total				**21-0-8-4**	**26**	**900**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

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 Modellingand 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
Total				**19-0-10-8**	**26**	**900**

Foundation Elective-IX

Sl. No.	Subject 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 hoursapproved 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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

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
Total				**18**	**300**

NAGARJUNACOLLEGEOFENGINEERING&TECHNOLOGY

(An Autonomous College under VTU)
(NAAC Accredited with 'A' Grade, NBA Accredited)

NAGARJUNA
COLLEGE OF ENGINEERING & TECHNOLOGY

An Autonomous College under VTU

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

With effect from Academic Year 2020-21

Scheme & Syllabus - M. Tech
Construction Technology

DEPARTMENT OF CIVILENGINEERING

VISION

To transform the students as leaders in CivilEngineering 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.

HOD Civil Engineering
Nagarjuna College of Engineering & Technology
Mudugurki Village, Venkatagirikote-Post
Devanahalli Taluk, Bengaluru -562 164

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 forenvironmental 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 havethe 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 ofcomplex 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 ofSolutions: 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 environmentalconsiderations.

PO-4: Conduct Investigations of Complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation ofdata and synthesis of the information to provide valid conclusions related to Civil Engineering problems.

PO-5: Modern Tool Usage: Create, select, andapply appropriate techniques, resources, andmodern 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 professionalCivil 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 forsustainable 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: Communicateeffectively 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 ateam, to manage Civil Engineering projectsand in multidisciplinary environments.

PO-12: Life Long Learning: Recognize theneed for, and have the preparation and ability to engage in independent and life-longlearning 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.

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Construction Technology

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

First Semester- Scheme

Sl. No	Course Code	Course	Teaching Department	L-T-P-S (Hrs/week)	Total Credits	Marks
1	20CCT11	MECHANIZATIONIN CONSTRUCTION	CV	4-0-0-0	4	100
2	20CCT12	ADVANCESIN CONSTRUCTION MATERIALS	CV	4-0-0-0	4	100
3	20CCT13	CONSTRUCTION PROJECTMANAGEMENT	CV	4-0-0-0	4	100
4	20CCT14	RISKANDMATERIAL MANAGMENET	CV	4-0-0-0	4	100
5	20CCT15X	ELECTIVE-I	CV	3-0-0-0	3	100
6	20CCT16	MATERIAL CHARACTERIZATION LABORATORY	CV	0-0-2-0	2	100
7	20CCT17	RESEARCHMETHODOLOGY & IPR	CV	2-0-0-0	2	100
Total				21-0-2-0	23	700

Elective–I		
Sl.No	**Course Code**	**Course**
1	20CCT151	INFRASTRUCTUREPLANNING
2	20CCT152	REPAIRANDREHABILITATIONOFSTRUCTURES
3	20CCT153	DESIGNOFENERGYEFFICIENTBUILDINGS

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Construction Technology

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

Second Semester -Scheme

Sl. No	Course Code	Course	Teaching Department	L-T-P-S (Hrs/week)	Total Credits	Marks
1	20CCT21	CONSTRUCTION QUALITYANDSAFETY	CV	4-0-0-0	4	100
2	20CCT22	CONSTRUCTIONECONOMICS&FINANCE	CV	4-0-0-0	4	100
3	20CCT23	CONSTRUCTIONCONTRACTMANAGEMENT	CV	4-0-0-0	4	100
4	20CCT24X	ELECTIVE-II	CV	4-0-0-0	4	100
5	20CCT25X	ELECTIVE–III	CV	4-0-0-0	4	100
6	20CCT26	PROJECT MANAGEMENTLAB	CV	0-0-2-0	2	100
7	20CCT27	TECHNICALSEMINAR-I	CV	0-0-0-2	1	50
Total				20-0-2-2	23	650

Elective–II		
Sl. No	**Course Code**	**Course**
1	20CCT241	PREENGINEEREDCONSTRUCTIONTECHNOLOGY
2	20CCT242	ADVANCEDCONSTRUCTIONTECHNIQUES
3	20CCT243	SOILEXPLORATION&GROUNDIMPROVEMENTTECHNIQUES

Elective–III		
Sl. No	**Course Code**	**Course**
1	20CCT251	LEANCONSTRUCTIONANDSUPPLYCHAINMANAGEMENT
2	20CCT252	QUANTITYSURVEYINGANDBILLING
3	20CCT253	SPECIALCONCRETE

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Construction Technology

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

Third Semester -Scheme

Sl. No	Course Code	Course	Teaching Department	L-T-P-S (Hrs/week)	Total Credits	Marks
1	20CCT31	SUSTAINABLEC ONSTRUCTION	CV	4-0-0-0	4	100
2	20CCT32X	ELECTIVE–IV	CV	4-0-0-0	4	100
3	20CCT33X	ELECTIVE–V	CV	4-0-0-0	4	100
4	20CCT34	DISSERTATION-PHASE 1	CV	0-0-4-4	3	100
5	20CCT35	MINIPROJECT	CV	0-0-2-0	2	100
6	20CCT36	INTERNSHIP	CV	0-0-4-0	4	100
7	20CCT37	TECHNICALSEMINAR-II	CV	0-0-0-2	1	50
Total				**12-0-10-6**	**22**	**650**

Elective–IV		
Sl. No	**Course Code**	**Course**
1	20CCT321	CONSTRUCTIONMETHODSTATEMENTPROCEDURES
2	20CCT322	PAVEMENTDESIGNANDCONSTRUCTION
3	20CCT323	BUILDINGSERVICESANDMAINTENANCE

Elective–V		
Sl. No	**Course Code**	**Course**
1	20CCT331	CONSTRUCTIONANDDEMOLITIONWASTEMANAGEMENT
2	20CCT332	QUANTITATIVEMETHODSINCONSTRUCTION
3	20CCT333	FORMWORKDESIGNOFSTRUCTURES

IC–IntegratedCourse	**L-Lecture**	**T-Tutorials**	**P-Practical**	**S-Self Study**

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Construction Technology

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

Fourth Semester - Scheme

Sl. No	Course Code	Course	Teaching Department	L-T-P-S (Hrs/week)	Total Credits	Marks
1	20CCT41	PROJECT PHASE-II	CV	-	5	50
2	20CCT42	PROJECT PHASE-III	CV	-	5	50
3	20CCT43	DISSERTATION EVALUATION	CV	-	5	100
4	20CCT44	PROJECT VIVA VOCE	CV	-	5	100
Total					20	300

NAGARJUNACOLLEGEOFENGINEERING&TECHNOLOGY

(An Autonomous College under VTU)
(NAAC Accredited with 'A' Grade, NBA Accredited)

NAGARJUNA
COLLEGE OF ENGINEERING & TECHNOLOGY

An Autonomous College under VTU

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

With effect from Academic Year 2019-20

Scheme & Syllabus - M. Tech
Construction Technology

DEPARTMENT OF CIVILENGINEERING

VISION

To transform the students as leaders in CivilEngineering 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.

HOD Civil Engineering
Nagarjuna College of Engineering & Technology
Mudugurki Village, Venkatagirikote Post
Devanahalli Taluk, Bengaluru-562 1[illegible]

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 forenvironmental 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 havethe 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 ofSolutions: 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 environmentalconsiderations.

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 professionalCivil 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 reportsand 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 toone's own work, as a member and leader in a team, to manage Civil Engineering projectsand in multidisciplinary environments.

PO-12: Life Long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-longlearning 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.

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Construction Technology

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

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	**Elective- I**	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
Total				**22-0-2-0**	**23**	**700**

Elective- I		
1	19CCT151	Infrastructure Planning
2	19CCT152	Earthquake resistant structures
3	19CCT153	Building Science

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Construction Technology

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

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	**Elective – 2**	Civil Engg.	4-0-0-0	4	100
5	19CCT25X	**Elective – 3**	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
Total				**20-0-2-4**	**22**	**700**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Construction Technology

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

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	**Elective – 4**	Civil Engg.	4-0-0-0	4	100
3.	19CCT33x	**Elective – 5**	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
Total				**12-0-4-28**	**21**	**500**

Elective – 4		
1.	19CCT321	Construction Method Statement Procedures
2.	19CCT322	Building Services and Maintenance
3.	19CCT323	Repair and Rehabilitation of structures
Elective – 5		
1	19CCT331	Construction and Demolition Waste Management
2	19CCT332	Formwork Design for Structures
3	19CCT333	Disaster Management Techniques

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Construction Technology

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

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
Total				**0-0-32-0**	**16**	**300**

NAGARJUNACOLLEGEOFENGINEERING&TECHNOLOGY

(An Autonomous College under VTU)
(NAACAccreditedwith'A'Grade,NBA Accredited)

NAGARJUNA
COLLEGE OF ENGINEERING & TECHNOLOGY

An Autonomous College under VTU

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

With effect from Academic Year 2018-19

Scheme & Syllabus - M. Tech
Construction Technology

DEPARTMENT OF CIVILENGINEERING

VISION

To transform the students as leaders in CivilEngineering 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.

Nagarjuna
HOD Civil Engineering
Nagarjuna College of Engineering & Technology
Nagarjuna Nilaya, Venkatagirihalli Post
Devanahalli Taluk, Bangalore -562 164

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 forenvironmental 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 systemcomponents or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmentalconsiderations.

PO-4: Conduct Investigations of Complexproblems: Use research-based knowledgeand 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 andcommit 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 ir 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 reportsand 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 toone's own work, as a member and leader in a team, to manage Civil Engineering projectsand in multidisciplinary environments.

PO-12: Life Long Learning: Recognize the need for, and have the preparation and ability to engage ir independent and life-longlearning 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 solution: to address societal needs and exhibit communication and teamwork skills.

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Construction Technology

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

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	**Elective- I**	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
		Total		23-0-2-0	**24**	**700**

Elective- I		
1.	18CCT151	Infrastructure Planning
2.	18CCT152	Earthquake resistant structures
3.	18CCT153	Building Science

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Construction Technology

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

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	**Elective – 2**	Civil Engg.	4-0-0-0	4	100
5.	18CCT25X	**Elective – 3**	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
		Total		21-0-2-4	**24**	**700**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Construction Technology

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

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	**Elective – 4**	Civil Engg.	4-0-0-0	4	100
3.	18CCT33x	**Elective – 5**	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
Total				**12-0-4-28**	**21**	**500**

Elective – 4		
1.	18CCT321	Construction Method Statement Procedures
2.	18CCT322	Building Services and Maintenance
3.	18CCT323	Repair and Rehabilitation of structures
Elective – 5		
1	18CCT331	Construction and Demolition Waste Management
2	18CCT332	Formwork Design for Structures
3	18CCT333	Online Course - 3

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Construction Technology

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

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
Total				**0-0-0-40**	**20**	**300**

NAGARJUNACOLLEGEOFENGINEERING&TECHNOLOGY

(An Autonomous College under VTU)
(NAAC Accredited with 'A' Grade, NBA Accredited)

NAGARJUNA
COLLEGE OF ENGINEERING & TECHNOLOGY

An Autonomous College under VTU

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

With effect from Academic Year 2016-17

Scheme & Syllabus - M. Tech
Construction Technology

DEPARTMENT OF CIVILENGINEERING

VISION

To transform the students as leaders in CivilEngineering 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.

HOD Civil Engineering
Nagarjuna College of Engineering & Technology
Mudugurki Village, Venkatagirikote-Post
Devanahalli Taluk, Bangaluru -562 164

PRINCIPAL
Nagarjuna College of Engineering & Technology
Devanahalli (Tq) Bengaluru (Dt.) Pin-562157

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 forenvironmental 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 havethe 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 ofcomplex 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 systemcomponents or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmentalconsiderations.

PO-4: Conduct Investigations of Complexproblems: Use research-based knowledgeand research methods including design of experiments, analysis and interpretation ofdata 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 professionalCivil 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 reportsand 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 toone's own work, as a member and leader in a team, to manage Civil Engineering projectsand in multidisciplinary environments.

PO-12: Life Long Learning: Recognize theneed for, and have the preparation and ability to engage in independent and life-longlearning 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.

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Construction Technology

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

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	**Elective- I**	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
		Total		21-2-4-4	**25**	**600**

Elective- I		
1.	15CCT151	Advanced Design of RC structures
2.	15CCT152	RS and GIS applications in Construction
3.	15CCT153	Building Science

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Construction Technology

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

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	**Elective – 2**	Civil Engg.	4-0-0-0	4	100
5.	15CCT25X	**Elective – 3**	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
		Total		21-4-4-4	**26**	**600**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Construction Technology

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

Third Semester- Scheme

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	**Elective – 4**	Civil Engg.	4-0-0-0	4	100
16.	15CCT33x	**Elective – 5**	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
			Total	12-4-0-2	**24**	**450**

Elective – 4		
1.	15CCT321	Project Safety Management
2.	15CCT322	Building Services and Maintenance
3.	15CCT323	Disaster Management
Elective – 5		
1.	15CCT331	Construction and Demolition Waste Management
2.	15CCT332	Formwork Design Of Structures
3.	15CCT333	Quantitative methods in construction

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Construction Technology

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

Fourth Semester- Scheme

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
			Total	-	**20**	**300**

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 examine

NAGARJUNA COLLEGE OF ENGG & TECH. BENGALURU

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous College under VTU) (NAAC Accredited with 'A' Grade, NBA Accredited)

NAGARJUNA

COLLEGE OF ENGINEERING & TECHNOLOGY

An Autonomous College under VTU

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

With effect from Academic Year 2020-21

Scheme & Syllabus –

M. TechStructural Engineering

DEPARTMENT OF CIVILENGINEERING

VISION

To transform the students as leaders in CivilEngineering 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 techniquesusing 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.

Nagarjuna College of Engineering & Technology
Mudugurki Village, Venkatagirikote-Post
Devanahalli Taluk, Bengaluru-562 164

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 forenvironmental 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 ofcomplex 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 environmentalconsiderations.

PO-4: Conduct Investigations of Complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation ofdata 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 professionalCivil 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 forsustainable 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 reportsand 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 toone'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 theneed for, and have the preparation and ability to engage in independent and life-longlearning 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.

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Structural Engineering

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

First Semester

Sl. No	Course Code	Course	Teaching Department	L-T-P-S (Hrs/week)	Total Credits	Marks
1	20CSE11	ADVANCED DESIGN OFRCCSTRUCTURES	CV	4-0-0-0	4	100
2	20CSE12	MECHANICSOFDEFOR MABLEBODIES	CV	4-0-0-0	4	100
3	20CSE13	COMPUTATIONAL STRUCTURALMECHANICS	CV	4-0-0-0	4	100
4	20CSE14	STRUCTURALDYNAMICS	CV	4-0-0-0	4	100
5	20CSE15X	**ELECTIVE- I**	CV	3-0-0-0	3	100
6	20CSE16	STRUCTURAL ENGINEERINGLAB-1	CV	0-0-2-0	2	100
7	20CSE17	RESEARCH METHODOLOGYAND IPR	CV	2-0-0-0	2	100
Total				21-0-2-0	23	700

Elective –I		
Sl.No	**Course Code**	**Course**
1	20CSE151	ADVANCEDDESIGNOFPRE-STRESSEDCONCRETE STRUCTURES
2	20CSE152	DESIGNOFPRECASTANDCOMPOSITESTRUCTURES
3	20CSE153	REPAIRANDREHABILITATIONOFSTRUCTURES

IC–Integrated Course	L-Lecture	T-Tutorials	P-Practical	S-SelfStudy

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Structural Engineering

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

Second Semester

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				**20-0-2-2**	**23**	**650**

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**

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Structural Engineering

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

Third Semester

Sl. No	Course Code	Course	Teaching Department	L-T-P-S (Hrs/week)	Total Credits	Marks
1	20CSE31	STABILITY OFSTRUCTURES	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	TECHNICALSEMINAR-II	CE	0-0-0-2	1	50
Total				**12-0-10-6**	**22**	**650**

Elective– IV		
Sl.No	**Course Code**	**Course**
1	20CSE321	DESIGNOFSUBSTRUCTURES
2	20CSE322	OFFSHORESTRUCTURES
3	20CSE323	DESIGNOFPLATESAND SHELLS

Elective –V		
Sl.No	**Course Code**	**Course**
1	20CSE331	DESIGNOFCOMPOSITESTRUCTURES
2	20CSE332	DESIGNOFMASONRYSTRUCTURES
3	20CSE333	FORMWORKDESIGN OFSTRUCTURES

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Structural Engineering

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

Fourth Semester

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 hase-III	CE	-	5	100
3	20CSE43	Dissertation Evaluation	CE	-	5	100
4	20CSE44	Project Viva voce	CE	-	5	100
Total					**20**	**400**

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous College under VTU) (NAAC Accreditedwith'A'Grade,NBA Accredited)

NAGARJUNA

COLLEGE OF ENGINEERING & TECHNOLOGY

An Autonomous College under VTU

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

With effect from Academic Year 2019-20

Scheme & Syllabus –

M. TechStructural Engineering

DEPARTMENT OF CIVILENGINEERING

VISION

To transform the students as leaders in CivilEngineering 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.

HOD Civil Engineering
Nagarjuna College of Engineering & Technology
Mudugurki Village, Venkatagirikote-Post
Devanahalli Taluk, Bengaluru-562 164

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 forenvironmental protection.

PEO4: Civil Engineering graduates will becapable of pursuing higher studies, take up research and development work blended with ethics and human values.

PEO5: Civil engineering graduates will havethe 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 ofcomplex 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 Complexproblems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation ofdata and synthesis of the information to provide valid conclusions related to Civil Engineering problems.

PO-5: Modern Tool Usage: Create, select, andapply appropriate techniques, resources, and modern engineering tools such as CAD, FEM, GIS, etc. including prediction and modeling tocomplex 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 professionalCivil 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 forsustainable development.

PO-8: Ethics: Apply ethical principles andcommit 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 toone's own work, as a member and leader in ateam, to manage Civil Engineering projectsand in multidisciplinary environments.

PO-12: Life Long Learning: Recognize theneed for, and have the preparation and ability to engage in independent and life-longlearning 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.

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Structural Engineering

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

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	**Elective- I**	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
Total				**22-0-2-0**	**23**	**700**

Elective- I		
1	19CSE151	Advanced Design of Pre-stressed Concrete Structures
2	19CSE152	Design of Precast & Composite Structures
3	19CSE153	Repair and Rehabilitation of Structures

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Structural Engineering

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

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	**Elective – 2**	Civil Engineering	4-0-0-0	4	100
5.	19CSE25x	**Elective – 3**	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
Total				20-0-2-4	**22**	**700**

Elective – 2		
1.	19CSE241	Design concept of Substructures
2.	19CSE242	Design of Concrete Bridges
3.	19CSE243	Optimization of Structures
Elective – 3		
1.	19CSE251	Design of Tall Structures
2.	19CSE252	Structural Health Monitoring
3.	19CSE253	Reliability analysis of Structures

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Structural Engineering

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

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	**Elective – 4**	Civil Engineering	4-0-0-0	4	100
3.	19CSE33x	**Elective – 5**	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
Total				**12-0-4-28**	**21**	**500**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Structural Engineering

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

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
Total				**0-0-32-0**	**16**	**300**

COLLEGE OF ENGG. & TECH. * NAGARJUNA * BENGALURU

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous College under VTU) (NAAC Accredited with 'A' Grade, NBA Accredited)

NAGARJUNA
COLLEGE OF ENGINEERING & TECHNOLOGY

An Autonomous College under VTU

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

With effect from Academic Year 2018-19

Scheme & Syllabus –

M. TechStructural Engineering

DEPARTMENT OF CIVILENGINEERING

VISION

To transform the students as leaders in CivilEngineering 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.

Nagendra
HOD Civil Engineering
Nagarjuna College of Engineering & Technology
Mudugurki Village, Venkatagirikote Post
Devanahalli Taluk, Bengaluru -562 164

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 forenvironmental 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 havethe 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 ofcomplex 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 ofSolutions: Design solutions for complex Civil Engineering problems and design systemcomponents or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal and environmentalconsiderations.

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 professionalCivil 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 reportsand 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 toone's own work, as a member and leader in a team, to manage Civil Engineering projectsand in multidisciplinary environments.

PO-12: Life Long Learning: Recognize theneed for, and have the preparation and ability to engage in independent and life-longlearning 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.

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Structural Engineering

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

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	**Elective- I**	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
		Total		23-0-2-0	**24**	**700**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Structural Engineering

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

Second Semester

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	**Elective – 2**	Civil Engg.	4-0-0-0	4	100
5.	18CSE25x	**Elective – 3**	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
			Total	21-0-2-4	**24**	**700**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Structural Engineering

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

Third Semester

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	**Elective – 4**	Civil Engg.	4-0-0-0	4	100
3.	18CSE33x	**Elective – 5**	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
			Total	12-0-0-16	**20**	**500**

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

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Structural Engineering

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

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
			Total	0-0-0-40	**20**	**300**

NAGARJUNACOLLEGEOFENGINEERING&TECHNOLOGY

(An Autonomous College under VTU)
(NAAC Accredited with 'A' Grade, NBA Accredited)

NAGARJUNA
COLLEGE OF ENGINEERING & TECHNOLOGY

An Autonomous College under VTU

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

With effect from Academic Year 2016-17

Scheme & Syllabus –

M. TechStructural Engineering

DEPARTMENT OF CIVILENGINEERING

VISION

To transform the students as leaders in CivilEngineering 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.

HOD Civil Engineering
Nagarjuna College of Engineering & Technology

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.

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.

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Structural Engineering

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

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	**Elective- I**	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
		Total		21-2-4-4	**25**	**600**

Elective- I		
1	15CSE151	Special Concrete
2	15CSE152	Design of Industrial Structures
3	15CSE153	Repair and Rehabilitation of Structures

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Structural Engineering

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

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	**Elective – 2**	Civil Engg.	4-0-0-0	4	100
5.	15CSE25x	**Elective – 3**	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
			Total	21-4-4-4	**26**	**600**

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.	15*CSE*252	Composite and Smart Materials
3.	15CSE253	Design of Concrete Bridges

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Structural Engineering

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

Third Semester

Sl . No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
1.	15CSE31	Stability of Structures	Civil Engg.	4-2-0-0	5	100
2.	15CSE32x	**Elective – 4**	Civil Engg.	4-0-0-0	4	100
3.	15CSE33x	**Elective – 5**	Civil Engg.	4-2-0-0	5	100
4.	15CSE34	Project Phase– 1	Civil Engg.	-	5	50
5.	15CSE35	Seminar - 3	Civil Engg.	0-0-0-2	1	50
6.	15CSE36	Internship/Term paper/Mini project	Civil Engg.	-	4	50
			Total	12-4-0-2	**24**	**450**

Elective – 3		
1.	15CSE321	Construction Materials, Methods and Equipments
2.	15CSE322	Industrial Steel Structures
3.	15CSE323	Advanced Construction Techniques
Elective – 4		
1.	15CSE331	Optimization Technique
2.	15CSE332	Masonry Structures
3.	15CSE333	Formwork Design Of Structures

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY

M. Tech Structural Engineering

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

Fourth Semester- Scheme

Sl . No	Course Code	Course Name	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
			Total	-	**20**	**300**

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 ENGG. & TECH. BENGALURU

SCHEME OF STUDY FOR 2020-22MBA BATCH

Scheme of Study - First Semester MBA

Sl. No	Course Code	Course Name	Teaching Dept.	L-T-P-S (Hrs./week)	Total Credits	Marks
1.	20MBA11	Economics for Business Decisions	MBA	4-0-0-0	4	100
2.	20MBA12	Management and Organizational Behaviour	MBA	4-0-0-0	4	100
3.	20MBA13	Marketing Management	MBA	4-0-0-0	4	100
4.	20MBA14	Accounting for Business Decisions	MBA	4-0-0-0	4	100
5.	20MBA15	Business Regulations	MBA	4-0-0-0	4	100
6.	20MBA16	Statistical Tools for Business Research	MBA	4-0-0-0	4	100
7.	20MBA17	Seminar 1	MBA	0-0-0-8	2	100
Total				**21-0-0-8**	**26**	**700**

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

SKILL DEVELOPMENT (Zero Credit Course)

S No	Course Code	Name of the Course	Course Credit
1.	**20 MBA 01**	Bridge Course (Course Curriculum Designed for Finance and Non Finance Based Back ground)	0
2.	**20 MBA 02**	Campus to Corporate Level 1	0
3.	**20 MBA 03**	Advance Excel	0

Scheme of Study –Second Semester MBA

Sl. No	Course Code	Course Name	Teaching Dept.	L-T-P-S (Hrs./week)	Total Credits	Marks
1.	20MBA21	Human Resource Management	MBA	4-0-0-0	4	100
2.	20MBA22	Financial Management	MBA	4-0-0-0	4	100
3.	20MBA23	Entrepreneurial Development	MBA	4-0-0-0	4	100
4.	20MBA24	Operation Research	MBA	4-0-0-0	4	100
5.	20MBA25	Business Research Methods	MBA	4-0-0-0	4	100
6.	20MBA26	Strategic Management	MBA	4-0-0-0	4	100
7.	20MBA27	Seminar 2	MBA	0-0-0-8	2	100
		Total		**24-0-0-8**	**26**	**700**

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

SKILL DEVELOPMENT (Zero Credit Course)

S No	Course Code	Name of the Course	Course Credit
1.	**20 MBA 04**	Fundamentals of Data Analytics	0
2.	**20 MBA 05**	Campus to Corporate Level 2	0

Scheme of Study – Third Semester MBA

Sl. No	Course Code	Course Name	Teaching Dept.	L-T-P-S (Hrs./week)	Total Credits	Marks
1.	20 MBA31	Organizational Study (Industry Integration/Study in NGO)	MBA	0-0-0-12	3	100
2.	20 MBA32	International Business	MBA	3-0-0-0	3	100
NOTE: Dual Specialisation is offered to the students. Of the four streams of electives offered, two streams are chosen as a combination for dual specialization.The same combination of streams continues for Third and Fourth Semesters. In the Third semester, five electives are offered, of which **Three papers**are chosen by the student. In the Fourth Semester, three electives are offered, of which **Two papers** are chosen by the student.						
HUMAN RESOURCE						
3.	20 MBA HR 31	Organization Change and Development	MBA	3-0-0-0	3	100
	20 MBA HR 32	Personal Growth & Interpersonal Effectiveness	MBA	3-0-0-0	3	100
	20 MBA HR 33	Performance Management and Reward Systems	MBA	3-0-0-0	3	100
	20 MBA HR 34	Labour Laws	MBA	3-0-0-0	3	100
	20 MBA HR 35	Strategic Human Resource Management	MBA	3-0-0-0	3	100
MARKETING						
4.	20 MBA MM 31	Services Marketing	MBA	3-0-0-0	3	100
	20 MBA MM 32	Consumer Behaviour	MBA	3-0-0-0	3	100
	20 MBA MM 33	Strategic Brand Management	MBA	3-0-0-0	3	100
	20 MBA MM 34	Marketing Research and Analytics	MBA	3-0-0-0	3	100
	20 MBA MM 35	International Marketing Management	MBA	3-0-0-0	3	100
FINANCE						
5.	20 MBA FM 31	Cost Accounting	MBA	3-0-0-0	3	100
	20 MBA FM 32	Investment Management	MBA	3-0-0-0	3	100
	20 MBA FM 33	Direct Tax	MBA	3-0-0-0	3	100
	20 MBA FM 34	Mergers Acquisitions and Corporate Restructuring	MBA	3-0-0-0	3	100
	20 MBA FM 35	Financial Market and Services	MBA	3-0-0-0	3	100
SUPPLY CHAINMANAGEMENT						
6.	20 MBA SCM 31	Advanced Operations Research	MBA	3-0-0-0	3	100
	20 MBA SCM 32	Supply Chain and logistics Management	MBA	3-0-0-0	3	100
	20 MBA SCM 33	Green Supply Chain Management	MBA	3-0-0-0	3	100
	20 MBA SCM 34	Strategic Purchasing and Quality Management	MBA	3-0-0-0	3	100
	20 MBA SCM35	Supply Chain Information	MBA	3-0-0-0	3	100

		System				
	Total			**24-0-0-0**	**24**	**800**

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	**Project Work**	MBA	0-0-0-48	12	300
NOTE: Dual Specialisation is offered to the students. Of the four streams of electives offered, two streams are chosen as a combination for dual specialization. The same combination of streams continues for Third and Fourth Semesters. In the Third semester, five electives are offered, of which **Three papers**are chosen by the student. In the Fourth Semester, three electives are offered, of which **Two papers** are chosen by the student.						
HUMAN RESOURCE						
2.	20 MBA HR 41	Organizational Leadership Development	MBA	3-0-0-0	3	100
	20 MBA HR 42	International Human Resource Management	MBA	3-0-0-0	3	100
	20 MBA HR 43	Human Resource Metrics & Analytics	MBA	3-0-0-0	3	100
MARKETING						
3.	20 MBA MM 41	Sales and Retail Management	MBA	3-0-0-0	3	100
	20 MBA MM 42	Integrated Marketing Communication and Sales Promotion	MBA	3-0-0-0	3	100
	20 MBA MM 43	Digital and Social Media Marketing	MBA	3-0-0-0	3	100
FINANCE						
4.	20 MBA FM 41	Indirect Taxation	MBA	3-0-0-0	3	100
	20 MBA FM 42	Financial Derivatives	MBA	3-0-0-0	3	100
	20 MBA FM 43	International Financial Management	MBA	3-0-0-0	3	100
SUPPLY CHAINMANAGEMENT						
5.	20 MBA SCM 41	Global Supply Chain Management	MBA	3-0-0-0	3	100
	20 MBA SCM 42	Enterprise Resource Planning	MBA	3-0-0-0	3	100
	20 MBA SCM 43	International Logistics Management	MBA	3-0-0-0	3	100
	Total			**12-0-0-48**	**24**	**700**

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

SEMESTER WISE CREDIT DISTRIBUTION

Sem	Credits
I	26
II	26
III	24
IV	24
Total	**100**

SCHEME OF STUDY FOR 2019-21MBA 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.	19MBA11	Management & Organizational Behaviour	MBA	3-0-0-4	4	100
9.	19MBA12	Executive Communication and Soft Skills Development	MBA	3-0-2-0	4	100
10.	19MBA13	Business Regulations	MBA	3-0-0-0	3	100
11.	19MBA14	Managerial Economics	MBA	3-0-0-4	4	100
12.	19MBA15	Accounting for Managers	MBA	3-0-0-4	4	100

13.	19MBA16	Statistics for Managers	MBA	3-0-0-4	4	100
14.	19MBA17	Business Research Methods	MBA	3-0-0-0	3	100
Total				**21-0-2-16**	**26**	**700**

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

Scheme of Study –Second Semester MBA

Sl. No	Course Code	Course Name	Teaching Dept.	L-T-P-S (Hrs./week)	Total Credits	Marks
8.	19MBA21	Human Resources Management	MBA	3-0-0-0	3	100
9.	19MBA22	Marketing Management	MBA	3-0-0-0	3	100
10.	19MBA23	Financial Management	MBA	3-0-0-4	4	100
11.	19MBA24	Business Ethics and Corporate Governance	MBA	3-0-0-0	3	100
12.	19MBA25	Operations Research	MBA	3-0-0-4	4	100
13.	19MBA26	International Business	MBA	3-0-0-4	4	100

14.	19MBA27	Fundamentals of Business Analytics	MBA	2-0-2-0	3	100
15.	19MBA28	In-plant Training	MBA	0-0-0-16	4	100
		Total		**20-0-2-28**	**28**	**800**

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

- **19MBA28 -** In-plant training for four weeks in between First and Second Semester

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
Electives						
HUMAN RESOURCE						
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

MARKETING						
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	InternationalMarketing Management	MBA	3-0-0-0	3	100
FINANCE						
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
SUPPLY CHAINMANAGEMENT						
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
	Total			**22-0-0-0**	**22**	**700**

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	**Project Work**	MBA	0-0-0-48	12	300
Electives						
HUMAN RESOURCE						
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
MARKETING						
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
	19MBAMM423	Digital and Social Media	MBA	3-0-0-0	3	100

		Marketing				
FINANCE						
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
SUPPLY CHAINMANAGEMENT						
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
	Total			**12-0-0-48**	**24**	**700**

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

SEMESTER WISE CREDIT DISTRIBUTION

Sem	Credits
I	26
II	28
III	22
IV	24
Total	**100**

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
Total				**20-0-6-12**	**26**	**700**

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
16.	18MBA21	Human Resources Management	MBA	3-0-0-0	3	100
17.	18MBA22	Marketing Management	MBA	3-0-0-0	3	100
18.	18MBA23	Financial Management	MBA	3-0-0-4	4	100
19.	18MBA24	Business Ethics and Corporate Governance	MBA	3-0-0-4	4	100
20.	18MBA25	Production and Operations Management	MBA	3-0-2-0	4	100
21.	18MBA26	International Business	MBA	3-0-0-4	4	100
22.	18MBA27	In-plant Training	MBA	0-0-0-16	4	100
		Total		**18-0-2-28**	**26**	**700**

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
1.	18MBA31	Strategic Management	MBA	3-0-0-4	4	100
2.	18MBA32	Entrepreneurship Development	MBA	3-0-0-4	4	100
3.	18MBA33	Certification Course	External Training	0-0-8-0	4	100
Electives						
HUMAN RESOURCE						
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
MARKETING						
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
FINANCE						
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

Total		**18-0-8-8**	**24**	**700**

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
Electives						
HUMAN RESOURCE						
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
MARKETING						
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
FINANCE						
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
Total				**12-0-0-48**	**24**	**700**

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

- Optional Certification Course in each specialization against a course can be allowed.

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
22.	17MBA11	Management & Organizational Behaviour	MBA	3-0-0-4	4	100
23.	17MBA12	Executive Communication	MBA	2-0-2-4	4	100
24.	17MBA13	Business Ethics and Corporate Governance	MBA	3-0-0-4	4	100
25.	17MBA14	Managerial Economics	MBA	3-0-0-4	4	100
26.	17MBA15	Accounting for Managers	MBA	3-0-2-0	4	100
27.	17MBA16	Quantitative Techniques	MBA	3-0-2-0	4	100
28.	17MBA17	Managerial Skill Development	MBA	0-0-0-8	2	100
Total				**17-0-6-24**	**26**	**700**

Scheme of Study –Second Semester MBA

Sl. No	Course Code	Course Name	Teaching Dept.	L-T-P-S (Hrs/week)	Total Credits	Marks
23.	17MBA21	Human Resources Management	MBA	3-0-0-4	4	100

24.	17MBA22	Marketing Management	MBA	3-0-0-0	3	100
25.	17MBA23	Financial Management	MBA	3-0-0-4	4	100
26.	17MBA24	Business Regulations	MBA	3-0-0-4	4	100
27.	17MBA25	Business Research Methods	MBA	2-0-2-0	3	100
28.	17MBA26	International Business and Strategic Management	MBA	3-0-2-0	4	100
29.	17MBA27	IT for Managers	MBA	0-2-2-0	2	50
30.	17MBA28	Inplant Training	MBA	0-0-0-8	2	50
		Total		**17-2-6-20**	**26**	**700**

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
4.	17MBA31	Entrepreneurship Skill Development	MBA	2-0-4-0	4	100
Electives						

BANKING & INSURANCE						
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
HUMAN RESOURCE						
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
MARKETING						
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
FINANCE						
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
Total				**14-0-4-16**	**20**	**500**

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
Electives						
BANKING & INSURANCE						
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
HUMAN RESOURCE						

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
MARKETING						
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
FINANCE						
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
Total				**15-0-12-28**	**28**	**800**

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

SEMESTER WISE CREDIT DISTRIBUTION

Sem	Credits
I	26
II	26
III	20
IV	28
Total	**100**

2015-17

Scheme of Study - First Semester – MBA

Sl. No	Subject Code	Subject	Teaching Dept	L-T-P-S (Hrs/week)	Total Credits	Marks
29.	15MBA11	Management & Organizational Behaviour	MBA	2-2-0-0	3	100
30.	15MBA12	Human Resource Management	MBA	3-0-2-0	4	100
31.	15MBA13	Marketing Management	MBA	3-0-2-0	4	100
32.	15MBA14	Accounting for Managers	MBA	3-0-2-4	5	100
33.	15MBA15	Quantitative Techniques	MBA	3-0-2-4	5	100
34.	15MBA16	Written Analysis & Executive Communication	MBA	3-0-2-0	4	100

35.	15MBA17	Economics for Managers	MBA	2-2-0-0	3	100
Total				**19-4-10-8**	**28**	**700**

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
31.	15MBA21	Entrepreneurial Strategy	MBA	3-0-2-0	4	100
32.	15MBA22	Financial Management	MBA	3-2-0-0	4	100
* **Electives (Two papers from Three streams)**						
I.HUMAN RESOURCE						
33.	15MBAHR211	Labor Legislations & welfare	MBA			
34.	15MBAHR212	Recruitment Selection & Compensation Management	MBA	3-0-0-4	4	100
35.	15MBAHR213	Organization Change & Development	MBA	3-0-0-4	4	100
II. MARKETING						
36.	15MBAMM221	Consumer Behaviour	MBA			
37.	15MBAMM222	Retail Management & e-commerce	MBA	3-0-0-4	4	100
38.	15MBAMM223	Service Marketing	MBA	3-0-0-4	4	100
III. FINANCE						
39.	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
IV. BANKING & INSURANCE						
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
Total				**24-2-2-24**	**32**	**800**

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
	15MBA31	Legal aspects of Business	MBA	3-0-1-0	4	100
*** Electives (Three papers from Two streams)**						
I. HUMAN RESOURCE						
	15MBAHR311	International Human Resource Management	MBA	2-0-0-1	3	100
	15MBAHR312	Learning & development	MBA	2-0-0-1	3	100
	15MBAHR 313	Work place ethics	MBA	2-0-0-1	3	100
	15MBAHR314	Personal growth & Stress Management	MBA	2-0-0-1	3	100
	15MBAHR 315	Public relations, conflict & negotiation management	MBA	2-0-0-1	3	100
II. MARKETING						
	15MBAMM321	Integrated marketing communications & Social Media marketing	MBA	2-0-0-1	3	100
	15MBAMM322	International marketing management	MBA	2-0-0-1	3	100
	15MBAMM323	Supply chain & logistics Management	MBA	2-0-0-1	3	100
	15MBAMM324	Strategic brand management	MBA	2-0-0-1	3	100
	15MBAMM325	Marketing research	MBA	2-0-0-1	3	100
III. FINANCE						
	15MBAFM331	Management Accounting & control systems	MBA	2-0-0-1	3	100
	15MBAFM332	Mergers & Acquisitions & corporate Restructuring	MBA	2-0-0-1	3	100
	15MBAFM333	International Financial management	MBA	2-0-0-1	3	100
	15MBAFM334	Tax Management	MBA	2-0-0-1	3	100
	15MBAFM335	Futures & options	MBA	2-0-0-1	3	100
IV. BANKING & INSURANCE						
	15MBAB&I 341	Banking Technology Management	MBA	2-0-0-1	3	100
	15MBAB&I 342	International Banking	MBA	2-0-0-1	3	100
	15MBAB&I 343	Investment Banking & Financial Services	MBA	2-0-0-1	3	100
	15MBAB&I 344	Treasury & Forex Management	MBA	2-0-0-1	3	100
	15MBAB&I 345	Strategic Credit Management	MBA	2-0-0-1	3	100
	15MBA32	Mini Project	MBA	0-0-0-4	4	100
Total				**24-2-2-24**	**26**	**800**

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