NATIONAL INSTITUTE OF TECHNOLOGY WARANGAL

B.Tech. in

COMPUTER SCIENCE AND ENGINEERING

SCHEME OF INSTRUCTION AND SYLLABI

(Effective from 2021-22)

Department of Computer Science and Engineering

NATIONAL INSTITUTE OF TECHNOLOGY WARANGAL

VISION

Towards a Global Knowledge Hub, striving continuously in pursuit of excellence in Education, Research, Entrepreneurship and Technological services to the society

MISSION

- Imparting total quality education to develop innovative, entrepreneurial and ethical future professionals fit for globally competitive environment.
- Allowing stake holders to share our reservoir of experience in education and knowledge for mutual enrichment in the field of technical education.
- Fostering product-oriented research for establishing a self-sustaining and wealth creating centre to serve the societal needs.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VISION

Attaining global recognition in Computer Science & Engineering education, research and training to meet the growing needs of the industry and society.

MISSION

- Imparting quality education through well-designed curriculum in tune with the challenging software needs of the industry.
- Providing state-of-art research facilities to generate knowledge and develop technologies in the thrust areas of Computer Science and Engineering.
- Developing linkages with world class organizations to strengthen industry-academia relationships for mutual benefit.

Department of Computer Science and Engineering:

Brief about the Department:

The Department of Computer Science & Engineering was established in the year 1991. The department offers high quality undergraduate, postgraduate and doctoral programs. The B. Tech (Computer Science and Engineering) program was started in the year 1983 with an intake of 20 students. The intake was subsequently increased to 120 in 2008. M. Tech (Computer Science and Engineering) program was started in 1987 with an intake of 18 and subsequently increased to 20 in 2008. M. Tech (Information Security) was introduced in the year 2008 Under ISEAP sanctioned by Ministry of Communication and Information Technology (MCIT), DOE, GOI, New Delhi with intake of 20. Later, it was renamed as Computer Science and Information Security. The Master of Computer Applications (MCA) program was started in 1986 with an intake of 30 and increased to 46 from 2008. B.Tech, M.Tech (CSE) and M.Tech (CSIS) programs were accredited in 2014 by NBA as per Washington Accord.

The department has distinguished and committed faculty members with PhD from reputed institutes. It has close rapport with MICROSOFT, TCS, INFOSYS, ORACLE, TRDDC-Pune, SUN Microsystems, EMC^2, ACCENTURE, C-DAC, MOTOROLA, HONEYWELL, NOVELL, PHILIPS, SAMSUNG, and IBM-Bangalore. The department has MOUs with TCS, IBM, C-DAC and INFOSYS, for training students and faculty on latest cutting edge technologies and also to pursue Research and Development activities. The Department has been selected as a Remote Center under Information Security Awareness Project (ISEAP) Phase II, MCIT Dept of IT. Along with department of ECE, it is associated in E&ICT Academy project sanctioned by Department of Electronics and Information Technology, Govt of India for Rs.25 crores to train faculty from Engineering and Polytechnic Streams across Telangana, Andhra Pradesh, Karnataka States and Pudicherry, Andaman & Nicobar islands and Lakshadweep UTs.

List of Programs offered by the Department:

Program	Title of the Program
B.Tech.	Computer Science and Engineering
M.Tech.	Computer Science and Engineering
	Computer Science and Information Security
M.C.A.	Master of Computer Applications
Ph.D.	Computer Science and Engineering

Note: Refer to the following weblink for Rules and Regulations of B.Tech. program:
https://www.nitw.ac.in/media/uploads/2021/08/27/btech_rules-and-regulations-2021-22.pdf

B.Tech. – Computer Science and Engineering

Program Educational Objectives

PEO-1	Apply computer science theory blended with mathematics and engineering to model computing systems.
PEO-2	Design, implement, test and maintain software systems based on requirement specifications
PEO-3	Communicate effectively with team members, engage in applying technologies and lead teams in industry.
PEO-4	Assess the computing systems from the view point of quality, security, privacy, cost, utility, etiquette and ethics.
PEO-5	Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs

Program Articulation Matrix

PEO / Mission Statements	PEO1	PEO2	PEO3	PEO4	PEO5
Imparting quality education through well-designed curriculum in tune with the challenging software needs of the industry.	3	3	2	3	2
Providing state-of-art research facilities to generate knowledge and develop technologies in the thrust areas of Computer Science and Engineering.	2	3	3	3	2
Developing linkages with world class organizations to strengthen industry-academia relationships for mutual benefit.	2	3	2	3	2

1-Slightly; 2-Moderately; 3-Substantially

B.Tech. – COPUTER SCIENCE AND ENGINEERING

Program Outcomes (POs)

At the end of the program, the student will be able to:

PO1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and computer science and engineering to the solution of complex engineering problems
PO2	**Problem analysis:** Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
PO3	**Design/Development of solutions:** Design solutions for complex computer science and engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex computer science and engineering activities with an understanding of the limitations
PO6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and 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, 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 Outcomes (PSOs)

PSO1	Design algorithms for real world computational problems and analyze their complexities.
PSO2	Design and develop interfaces among subsystems of computing.
PSO3	Analyze large data samples and discover knowledge to provide solutions to engineering problems.
PSO4	Assess security, privacy, quality and cost parameters in developing software systems.

SCHEME OF INSTRUCTION

B.Tech. (Computer Science and Engineering) Course Structure

Induction Program (Two Weeks) - Mandatory

I – Year: I – Semester

S.No.	Course Code	Course Title	L	T	P	Credits	Cat. Code
1	IC001	Induction Program *				0	MNC
2	MA137	Linear Algebra, Calculus and Differential Equations	3	0	0	3	BSC
3	HS132	English for Technical Communication	2	0	2	3	HSC
4	PH131	Applied Physics	3	0	0	3	BSC
5	SM131	Economics and Financial Analysis	3	0	0	3	HSC
6	CS101	Problem Solving and Computer Programming	3	0	0	3	ESC
7	PH132	Applied Physics Laboratory	0	0	4	2	BSC
8	CS102	Problem Solving and Computer Programming Laboratory	0	1	4	3	ESC
9	IC101	Extra Academic Activity - I *	0	0	2	0	MNC
		Total	**14**	**1**	**12**	**20**	

* MNC weblink: https://www.nitw.ac.in/media/uploads/2021/10/22/mnc_1st-year.pdf

I – Year: II – Semester

S.No.	Course Code	Course Title	L	T	P	Credits	Cat. Code
1	MA187	Integral Calculus and Transforms	3	0	0	3	BSC
2	EC181	Analog and Digital Electronics	3	0	0	3	ESC
3	CS151	Discrete Mathematics	3	0	2	4	BSC
4	CS152	Data Structures	3	0	0	3	ESC
5	EC182	Analog and Digital Electronics Laboratory	0	1	2	2	ESC
6	CS153	Data Structures Laboratory	0	2	2	3	ESC
7	IC151	Extra Academic Activity - II *	0	0	2	0	MNC
		Total	**12**	**3**	**8**	**18**	

* MNC weblink: https://www.nitw.ac.in/media/uploads/2021/10/22/mnc_1st-year.pdf