JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
KAKINADA – 533 003, Andhra Pradesh, India

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE STRUCTURE AND SYLLABUS

For UG – R20

B. TECH - INFORMATION TECHNOLOGY

(Applicable for batches admitted from 2020-2021)

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COURSE STRUCTURE

I Year – I SEMESTER

S. No	Course Code	Courses	L	T	P	Credits
1	HS	Communicative English	3	0	0	3
2	BS	Mathematics - I (Calculus And Differential Equations)	3	0	0	3
3	BS	Applied Physics	3	0	0	3
4	ES	Programming for Problem Solving using C	3	0	0	3
5	ES	Computer Engineering Workshop	1	0	4	3
6	HS	English Communication Skills Laboratory	0	0	3	1.5
7	BS	Applied Physics Lab	0	0	3	1.5
8	ES	Programming for Problem Solving using C Lab	0	0	3	1.5
		Total Credits				**19.5**

I Year – II SEMESTER

S. No	Course Code	Courses	L	T	P	Credits
1	BS	Mathematics – II (Linear Algebra And Numerical Methods)	3	0	0	3
2	BS	Applied Chemistry	3	0	0	3
3	ES	Computer Organization	3	0	0	3
4	ES	Python Programming	3	0	0	3
5	ES	Data Structures	3	0	0	3
6	BS	Applied Chemistry Lab	0	0	3	1.5
7	ES	Python Programming Lab	0	0	3	1.5
8	ES	Data Structures Lab	0	0	3	1.5
9	MC	Environment Science	2	0	0	0
		Total Credits				**19.5**

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II Year – I SEMESTER

S.No	Course Code	Courses	L	T	P	Credits
1	BS	Mathematics - III	3	0	0	3
2	IT	Object Oriented Programming through C++	3	0	0	3
3	IT	Operating Systems	3	0	0	3
4	IT	Database Management Systems	3	0	0	3
5	IT	Discrete Mathematics and Graph Theory	3	0	0	3
6	IT	Object Oriented Programming through C++ Lab	0	0	3	1.5
7	IT	Operating Systems Lab	0	0	3	1.5
8	IT	Database Management Systems Lab	0	0	3	1.5
9	SO	Skill oriented Course - I 1) Animations- 2D Animation 2) Distributed Technologies- NoSQL	0	0	4	2
10	MC	Constitution of India	2	0	0	0
		Total Credits				**21.5**

II Year – II SEMESTER

II Year – II SEMESTER						
S.No	**Course Code**	**Courses**	**L**	**T**	**P**	**Credits**
1	BS	Statistics with R	2	0	2	3
2	IT	Principles of Software Engineering	3	0	0	3
3	IT	Automata Theory and Compiler Design	3	0	0	3
4	ES	Java Programming	3	0	0	3
5	HS	Managerial Economics and Financial Accountancy	3	0	0	3
6	IT	UML Lab	0	1	2	2
7	IT	FOSS Lab	0	0	2	1
8	ES	Java Programming Lab	0	0	3	1.5
9	SO	**Skill Oriented Course II** 1) Animations- 3D Animation 2) Distributed Technologies- MongoDB	0	0	4	2
Total Credits						**21.5**
10	Minor	Object Oriented Programming through C++[$]	3	0	2	4
11	Honors	Any course from the Pool, as per the opted track	4	0	0	4

$- Integrated Course

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III B. Tech – I Semester

S.No	Course Code	Courses	Hours per week			Credits
			L	T	P	C
1	PC	Computer Networks	**3**	**0**	**0**	**3**
2	PC	Design and Analysis of Algorithms	**3**	**0**	**0**	**3**
3	PC	Data Mining Techniques	**3**	**0**	**0**	**3**
4	Open Elective/Job Oriented	**Open Elective-I** Open Electives offered by other departments/ DevOps (Job Oriented course)	**3**	**0**	**0**	**3**
5	PE	**Professional Elective-I** 1. Artificial Intelligence 2. Agile Software Process 3. Distributed Systems 4. Advanced Unix Programming	**3**	**0**	**0**	**3**
6	PC	Data Mining Techniques with R Lab	**0**	**0**	**3**	**1.5**
7	PC	Computer Networks Lab	**0**	**0**	**3**	**1.5**
8	SO	**Skill Oriented Course - III** 1.Animation course: Animation Design 2.CICD using DevOps	**0**	**0**	**4**	**2**
9	MC	Employability Skills-I	**2**	**0**	**0**	**0**
10	PR	**Summer Internship 2 Months(Mandatory) after second year(to be evaluated during V semester**	**0**	**0**	**0**	**1.5**
Total credits						**21.5**
11	Minor	Computer Networks[$]	3	0	2	4
12	Honors	Any course from the Pool, as per the opted track	4	0	0	4

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III B. Tech – II Semester						
S.No	**CourseCode**	**Courses**	**Hours per week**			**Credits**
			L	**T**	**P**	**C**
1	PC	Machine Learning	**3**	**0**	**0**	**3**
2	PC	Big Data Analytics	**3**	**0**	**0**	**3**
3	PC	Cryptography and Network Security	**3**	**0**	**0**	**3**
4	PE	**Professional Elective-II** 1.Mobile Computing 2.MEAN Stack Development 3. Design Patterns 4.Scripting Languages	**3**	**0**	**0**	**3**
5	Open Elective/Job Oriented	**Open Elective-II** Open Electives offered by other departments	**3**	**0**	**0**	**3**
6	PC	Big Data Analytics lab	**0**	**0**	**3**	**1.5**
7	PC	Machine Learning using Python Lab	**0**	**0**	**3**	**1.5**
8	PC	Cryptography and Network Security Lab	**0**	**0**	**3**	**1.5**
9	SO	**Skill Oriented Course - IV** 1.Data Science: Natural Language Processing 2.Video Analytics	**0**	**0**	**4**	**2**
10	MC3201	Employability skills-II	**2**	**0**	**0**	**0**
Total credits						**21.5**
Industrial/Research Internship(Mandatory) 2 Months during summer vacation						
11	Minor	Data Structures and Algorithms[$]	3	0	2	4
12	Honors	Any course from the Pool, as per the opted track	4	0	0	4
Minor course through SWAYAM			**-**	**-**	**-**	**2**

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IV B. Tech –I Semester						
S.No	**Course Code**	**Course Title**	**Hours per week**			**Credits**
			L	**T**	**P**	**C**
1	PE	**Professional Elective-III** 1.Cloud Computing 2. Artificial Neural Networks 3. Internet of Things (IoT) 4.Cyber Security & Forensics	**3**	**0**	**0**	**3**
2	PE	**Professional Elective-IV** 1. Deep Learning Techniques 2. Social Networks Analysis 3. Advanced Databases 4.MOOCS-NPTEL/SWAYAM	**3**	**0**	**0**	**3**
3	PE	**Professional Elective-V** 1.Block-Chain Technologies 2.M-Commerce 3.Ethical Hacking 4.MOOCS-NPTEL/SWAYAM	**3**	**0**	**0**	**3**
4	Open Elective /Job Oriented	**Open Elective-III** Open Electives offered by other departments	**2**	**0**	**2**	**3**
5	Open Elective /Job Oriented	**Open Elective-IV** Open Electives offered by other departments	**2**	**0**	**2**	**3**
6	HS	Universal Human Values 2: Understanding Harmony	**3**	**0**	**0**	**3**
7	SO	1. PYTHON: Deep Learning /APSSDC offered Courses 2. Secure Coding Techniques	**0**	**0**	**4**	**2**
8	PR	**Industrial/Research Internship 2 months (Mandatory) after third year (to be evaluated during VII semester**	**0**	**0**	**0**	**3**
Total credits						**23**
11	Minor	Software Engineering$ / any other from PART-B (For Minor)	3	0	2	4
12	Honors	Any course from the Pool, as per the opted track	4	0	0	4
Minor course through SWAYAM			**-**	**-**	**-**	**2**

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IV B. Tech –II Semester						
S.No	**Course Code**	**Course Title**	**Hours per week**			**Credits**
			L	**T**	**P**	**C**
1	Project	Major Project Work, Seminar Internship	**-**	**-**	**-**	**12**
Total credits						**12**

Suggested Courses for Honors Program

POOL1- AI & ML 1. Mathematics for Machine Learning 2. Text Mining and Time Series Analysis 3. Natural Language Processing 4. Reinforcement Learning	**POOL2- Systems Engineering** 1. Data Communications and Information Coding Theory 2. Internet of Things 3. Service Oriented Architectures 4. Design of Secure Protocols 5. Network Coding
POOL3- Information Security 1. Computational Number Theory 2. Cryptanalysis 3. Elliptic Curve Cryptography 4. Introduction to Quantum Computing and Quantum Cryptography 5. Public Key Infrastructure and Trust Management 6. Information Security Analysis and Audit 6. Principles of Cyber Security 7. Cloud and IoT Security 8. Web Security 9. Block Chain Architecture Design and Use Cases	**POOL4 – Data Science** 1. Statistical Foundations for Data Science 2. Mining Massive Data Sets 3. Data Visualization 4. Medical Image Data Processing

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Suggested Courses for MINOR Engineering in IT

Note:

1. Any THREE courses *(Any FOUR courses in case of MOOCS)* need to be studied from PART-A.
2. Any ONE course (*If it is in Regular Mode*) need to be studied from PART-B.
3. TWO, NPTEL courses of EIGHT week duration covering a total of 4 credits (offered by the department of CSE/IT only), Student can register at any time after the completion of II B.Tech. I Sem.
4. Students can pursue suggested MOOC Courses via NPTEL from II B.Tech II Sem and onwards, by prior information to the concern.
5. If sufficient numbers of students are not opted, as per the guidelines, dept can suggest students to pursue under MOOCS. In this case, department/students can select course such that there will not be any duplication.

Eligibility for Minor in IT:

PART A						
Regular Mode				MOOCS*		
S.No	**Subject**	**L-T-P**	**Credits**	**Course available in NPTEL**	**NPTEL Link**	**Credits**
1	Operating Systems	3-0-2	4	Operating Systems	https://onlinecourses.swayam2.ac.in/cec21_cs20/preview	As recommended by the NPTEL (Dept need to verify the credits and suggest)
2	Data Structures and Algorithms	3-0-2	4	Data Structure and algorithms using Java	https://nptel.ac.in/courses/106105225	
3	Software Engineering	3-0-2	4	Software Engineering	https://onlinecourses.swayam2.ac.in/cec21_cs21/preview	
4	Computer Networks	3-0-2	4	Computer Networks	https://onlinecourses.swayam2.ac.in/cec22_cs05/preview	
5	Database Management Systems	3-0-2	4	Data Base Management System	https://onlinecourses.nptel.ac.in/noc22_cs51/preview	
* If sufficient number of students are not available to offer, can pursue under MOOCS						

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PART B						
S.No	**Subject**	**L-T-P**	**Credits**	**Course available in NPTEL**	**NPTEL Link**	**Credits**
1	Object Oriented Programming through C++	3-0-2	4	Programming in C++ (Two Credits)	https://onlinecourses.nptel.ac.in/noc21_cs02/preview	As recommended by the NPTEL (Dept need to verify the credits and suggest)
2	Data Analytics using Python	3-0-2	4	Data Analytics with Python	https://nptel.ac.in/courses/106107220	
3	Artificial Intelligence	4-0-0	4	Artificial Intelligence: Knowledge Representation And Reasoning	https://nptel.ac.in/courses/106106140	
				OR		
				An Introduction to Artificial Intelligence	https://onlinecourses.nptel.ac.in/noc22_cs56/preview	
4	Unix and Shell Programming	3-0-2	4			
5	Cloud Computing	4-0-0	4	Cloud computing	https://onlinecourses.nptel.ac.in/noc22_cs20/preview	
				OR		
				Cloud Computing and Distributed Systems (TWO Credits)	https://onlinecourses.nptel.ac.in/noc21_cs15/preview	
* If sufficient number of students are not available to offer, can pursue under MOOCS						