

VASIREDDY VENKATADRI INSTITUTE OF TECHNOLOGY

Nambur (V), Pedakakani (M), Guntur (Dt.), Andhra Pradesh – 522 508

DEPARTMENT OF COMPUTER ENGINEERING

COURSE STRUCTURE AND SYLLABUS

for

B. Tech – Artificial Intelligence & Data Science

(Applicable for batches admitted from 2020-2021)



VASIREDDY VENKATADRI INSTITUTE OF TECHNOLOGY

(Autonomous)

Approved by AICTE, Permanently Affiliated to JNTUK,

NAAC Accredited with 'A' Grade, ISO 9001:2015 Certified

Nambur (V), Pedakakani (M), Guntur (Dt.), Andhra Pradesh – 522 508

COURSE STRUCTURE

Definition of Credit (C)

1 Hour Lecture (L) per week	1 Credit
1 Hour Tutorial (T) per week	1 Credit
1 Hour Practical (P) per week	0.5 Credit

Structure of B. Tech program Regulation R20

S.No.	Category	Code	Suggested Breakup of Credits by AICTE	Suggested Breakup of Credits by APSCHE	Breakup of Credits
1	Humanities and Social Sciences including Management courses	HS	12	10.5	10.5
2	Basic Science courses	BS	25	21	21
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/ computer etc	ES	24	24	22.5
4	Professional core courses	PC	48	51	52.5
5	Professional Elective courses relevant to chosen specialization/ branch	PE	18	15	15
6	Open subjects – Electives from other technical and /or emerging subjects	OE	18	12	12
7	Project work, seminar and internship in industry or elsewhere	PR	15	16.5	16.5
8	Mandatory Courses [Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Traditional Knowledge]	NC	Non-Credit	Non-Credit	Non-Credit
9	Skill Oriented Courses	SC	--	10	10
Total			160	160	160

SEMESTER-WISE STRUCTURE OF CURRICULUM

Course structure for eight semesters during four years of study is as follows

I Year I Semester (Semester-1)

S No.	Course Code	Course Name	L	T	P	C
1	BS1101	Mathematics-I	2	1	0	3
2	BS1102	Applied Chemistry	3	0	0	3
3	ES1101	Basic Electrical and Electronics Engineering	2	1	0	3
4	ES1102	Computer Engineering Workshop	1	0	4	3
5	ES1103	Problem Solving using C	2	1	0	3
6	BS1102L	Applied Chemistry Lab	0	0	3	1.5
7	ES1101L	Basic Electrical & Electronics Engineering Lab	0	0	3	1.5
8	ES1103L	Problem Solving using C Lab	0	0	3	1.5
Total Credits						19.5

Category		Credits
BS	Basic Science Courses	3+3+1.5=7.5
ES	Engineering Science Courses	3+3+3+1.5+1.5=12
Total Credits		19.5

I Year II Semester (Semester-2)

S.No.	Course Code	Course Name	L	T	P	C
1	BS1201	Mathematics – II	2	1	0	3
2	BS1202	Applied Physics	2	1	0	3
3	HS1201	Communicative English	3	0	0	3
4	ES1201	Problem Solving using Python	3	0	0	3
5	ES1202	Digital Logic Design	2	1	0	3
6	BS1202L	Applied Physics Lab & Virtual Lab	0	0	3	1.5
7	HS1201L	Communicative English Lab	0	0	3	1.5
8	ES1201L	Problem Solving using Python Lab	0	0	3	1.5
9	MC1201	Environmental Science	2	0	0	0
Total						19.5

Category		Credits
BS	Basic Science Courses	3+3+1.5=7.5
HS	Humanities and Social Science Courses	3+1.5=4.5
ES	Engineering Science Courses	3+3+1.5=7.5
Total Credits		19.5

II Year I Semester (Semester-3)

S.No.	Course Code	Course Name	L	T	P	C
1	BS2101	Mathematics - III	2	1	0	3
2	PC2101	Mathematical Foundations of Computer Science	2	1	0	3
3	PC2102	Data Structures	3	0	0	3
4	PC2103	Java Programming	3	0	0	3
5	PC2104	Database Management Systems	3	0	0	3
6	PC2102L	Data Structures Lab	0	0	3	1.5
7	PC2103L	Java Programming Lab	0	0	3	1.5
8	PC2104L	Database Management Systems Lab	0	0	3	1.5
9	SOC2101	Advanced Python Programming	1	0	2	2
10	MC2101	Essence of Indian Traditional Knowledge	2	0	0	0
Total						21.5

Category		Credits
BS	Basic Science Courses	3
PC	Professional core courses	3+3+3+3+1.5+1.5+1.5=16.5
SOC	Skill Oriented Course	2
Total Credits		21.5

II Year II Semester (Semester-4)

S No.	Course Code	Course Name	L	T	P	C
1	BS2201	Probability and Statistics	2	1	0	3
2	ES2201	Computer Organization	3	0	0	3
3	PC2201	Operating Systems	3	0	0	3
4	PC2202	Software Engineering	3	0	0	3
5	PC2203	Data Warehousing and Data Mining	3	0	0	3
6	PC2201L	Operating Systems Lab	0	0	3	1.5
7	PC2202L	Software Engineering Lab	0	0	3	1.5
8	PC2203L	Data Warehousing and Data Mining Lab	0	0	3	1.5
9	SOC2201	R Programming	1	0	2	2
Total						21.5
		Internship/Community Service Project 2 Months (Mandatory) during summer vacation				
		Honors/Minor courses	3	1	0	4

Category		Credits
BS	Basic Science Courses	3
ES	Engineering Science Courses	3
PC	Professional core courses	3+3+3+1.5+1.5+1.5=13.5
SOC	Skill Oriented Course	2
Total Credits		21.5

III Year I Semester (Semester-5)

S.No.	Course Code	Course Name	L	T	P	C
1	PC3101	Computer Networks	3	0	0	3
2	PC3102	Design and Analysis of Algorithms	3	0	0	3
3	PC3103	Automata Theory and Compiler Design	3	0	0	3
4	PE3101	Professional Elective I	2	0	2	3
5	OE3101	Open Elective I	2	0	2	3
6	PC3101L	Computer Networks Lab	0	0	3	1.5
7	PC3102L	Design and Analysis of Algorithms Lab	0	0	3	1.5
8	SOC3101	Tableau	1	0	2	2
9	MC3101	Indian Constitution	2	0	0	0
10	INTERN3101	Summer Internship 2 Months (Mandatory) after second year (to be evaluated during V semester)	0	0	3	1.5
Total						21.5
		Honors/Minor courses	3	1	0	4

Category		Credits
PC	Professional Core Courses	3+3+3+1.5+1.5=12
PE	Professional Elective Courses	3
OE	Open Elective Courses/Job Oriented Elective Courses	3
SAC	Skill Advanced Course/Soft Skills Course	2
INTERN	Summer Internship	1.5
Total Credits		21.5

III Year II Semester (Semester-6)

S No.	Course Code	Course Name	L	T	P	C
1	HS3201	Engineering Economics and Management	3	0	0	3
2	PC3201	Artificial Intelligence	3	0	0	3
3	PC3202	Data Science, Preparation and Analysis	3	0	0	3
4	PE3201	Professional Elective II	2	0	2	3
5	OE3201	Open Elective II	2	0	2	3
6	PC3201L	Artificial Intelligence Tools and Techniques Lab	0	0	3	1.5
7	PC3202L	Data Science, Preparation and Analysis Lab	0	0	3	1.5
8	PC3203L	Full Stack Lab	0	0	3	1.5
9	SOC3201	Soft Skills	1	0	2	2
10	MC3201	Public Administration	2	0	0	0
Total						21.5
		Industrial/Research Internship 2 Months (Mandatory) during summer vacation				
		Honors/Minor courses	3	0	2	4

Category		Credits
HS	Humanities and Social Science Courses	3
PC	Professional Core Courses	3+3+1.5+1.5+1.5=10.5
PE	Professional Elective Courses	3
OE	Open Elective Courses/Job Oriented Elective Courses	3
SAC	Skill Advanced Course/Soft Skills Course	2
Total Credits		21.5

IV Year I Semester (Semester-7)

S.No.	Course Code	Course Name	L	T	P	C
1	HS4101	Universal Human Values-2: Understanding Harmony	3	0	0	3
2	PE4101	Professional Elective III	2	0	2	3
3	PE4102	Professional Elective IV	2	0	2	3
4	PE4103	Professional Elective V	2	0	2	3
5	OE4101	Open Elective III	2	0	2	3
6	OE4102	Open Elective IV	2	0	2	3
7	SOC4101	Mongo DB	1	0	2	2
8	INTERN4101	Summer Internship 2 Months (Mandatory) after third year (to be evaluated during VII semester)	0	0	3	3
Total						23
		Honors/Minor courses	3	0	2	4

Category		Credits
HS	Humanities and Social Science Courses	3
PE	Professional Elective Courses	3+3+3=9
OE	Open Elective Courses/Job Oriented Elective Courses	3+3=6
SAC	Skill Advanced Course/Soft Skills Course	2
INTERN	Summer Internship	3
Total Credits		23

IV Year II Semester (Semester-8)

S. No	Subject code	Course Name	L	T	P	C
1	PROJ4201	Major Project - Viva Voce	0	0	0	12
		Internship (6 months)				
Total Credits						12

Open Elective Courses

OE3101	Optimization Techniques	Cryptography and Network Security	High Performance Computing	Environmental Pollution and Control
OE3201	Full Stack Development	Cloud Computing	Embedded Systems	Green Buildings
OE4101	Graph Theory	Computational Number Theory	Internet of Things	E-Waste management
OE4102	Fuzzy Sets, Logic and Systems	Soft Computing	Robotics	Supply Chain Management

Professional Elective Courses

PE3101	Big Data Analytics	Business Intelligence	Predictive Analysis	Pattern Recognition	Software Architecture and Design Patterns
PE3201	(NPTEL/SWAYAM) Duration: 12 Weeks minimum *Course/subject title can't be repeated				
PE4101	Machine Learning	Sentiment Analysis	Data Science Applications of NLP Vision	Autonomous Systems with Deep Learning	Software Project Management
PE4102	NO – SQL Databases	Deep Learning	Geospatial and Time Oriented Analysis	Bio-Imaging	Software Testing Methodologies
PE4103	Dimensionality Reduction and Model Validation Techniques	AI in Social Media	Real Time AI Video Analytics	Computer Vision	Cyber Law and Ethics

Courses for Honors degree

POOL-1	POOL-2	POOL-3	POOL-4
Database Security	Script Programming	Cloud Essentials	Introduction to IOT & Networking
Distributed Databases	Advanced Operating Systems	Block Chain Technologies	IoT Malware Analysis
Ethical Hacking	Web Programming in React JS	Bitcoin and Cryptocurrency Technologies	IoT Privacy & Security
Semantic Web and Social Networks	Node JS	FOG Computing	Advanced tools for IoT
Recommendation Systems	Testing Tools	Storage Area Networks	Network Programming
MOOC-1* (NPTEL/SWAYAM) Duration: 12 Weeks minimum			
MOOC-2* (NPTEL/SWAYAM) Duration: 12 Weeks minimum			

*Course/subject title can't be repeated

Note:

1. Students has to acquire 16 credits with minimum one subject from each pool
2. Compulsory MOOC/NPTEL course for 4 credits (2 course, each 2 credited)

General Minor degree courses offered by CE department:

- 1) Python Programming
- 2) Database Management Systems
- 3) Data Warehousing and Data Mining
- 4) Big Data Analytics
- 5) Data Science
- 6) Artificial Intelligence and Machine Learning
- 7) Data Preparation and Analysis
- 8) Business Intelligence
- 9) No-SQL
- 10) Dimensionality Reduction and Model Validation Techniques
- 11) Data Visualization

Note:

- i. A Student can select four subjects from the above 11 subjects @ 3-0-2-4 credits per subject.
- ii. Compulsory MOOC/NPTEL courses for 04 credits (02 courses @ 02 credits each)

VVIT Life skill courses

The following courses are admitted to be the **courses beyond curriculum** to improve individual life skills. These courses and will be demonstrated in the class room and will be having an internal assessment for satisfactory.

S. No	Year and Semester	Course Name
1	I Year I Semester (Semester-1)	Quantitative Aptitude
2	I Year II Semester (Semester-2)	Verbal Ability
3	II Year I Semester (Semester-3)	Understanding Self for Effectiveness
4	II Year II Semester (Semester-4)	Design Thinking
5	III Year I Semester (Semester-5)	Stress and Coping Strategies
6	III Year II Semester (Semester-6)	Research Skills