Anil Neerukonda Institute of Technology & Sciences (Autonomous)
(Permanent Affiliation by Andhra University & Approved by AICTE
Accredited by NBA (ECE, EEE, CSE, IT, Mech. Civil & Chemical) & NAAC)
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

R23 Course Structure

I Year Course structure – CSE										
Semester –I										
CODE	**SUBJECT NAME**	**Category**	**Periods**				**Sessional Marks**	**Semester end Exam marks**	**Total Marks**	**Credits**
			L	**T**	**P**	**Total**				
23MA1101	Linear Algebra & Multivariable Calculus	BS	2	1	0	3	40	60	100	3
23EN2101	Communicative English	HS	3	0	0	3	40	60	100	3
23CY1102	Applied Chemistry	BS	2	1	0	3	40	60	100	3
23EC3102	Basics of Electrical and Electronics Engineering	ES	2	1	0	3	40	60	100	3
23CS3101	Problem Solving and Programming using C	ES	3	0	0	3	40	60	100	3
23CY1202	Applied Chemistry Lab	BS	0	0	3	3	50	50	100	1.5
23EN2201	Communicative English Language Lab	HS	0	0	3	3	50	50	100	1.5
23CS3201	Problem Solving and Programming using C – Lab.	ES	0	0	3	3	50	50	100	1.5
23CS9201	Information Technology Fundamentals	SC	0	0	3	3	50	50	100	0
23MC0101	Universal Human Values & Professional Ethics	MC	2	0	0	2	0	0	0	0
Total			**14**	**3**	**12**	**29**	**400**	**500**	**900**	**19.5**

I Year Course structure – CSE										
Semester –II										
CODE	**SUBJECT NAME**	**Category**	**Periods**				**Sessional Marks**	**Semester end Exam marks**	**Total Marks**	**Credits**
			L	**T**	**P**	**Total**				
23MA1202	Ordinary Differential Equations & Numerical Methods	BS	2	1	0	3	40	60	100	3
23PY1102	Applied Physics	BS	3	0	0	3	40	60	100	3
23ME3203	Design Thinking	ES	1	0	2	3	40	60	100	2
23CS3102	Object Oriented Programming using C++	PC	2	0	0	2	40	60	100	2
23EC3103	Digital Logic Design	ES	3	0	0	3	40	60	100	3
23PY1202	Applied Physics Lab	BS	0	0	3	3	50	50	100	1.5
23ME3204	Computer Aided Drafting and Modelling Lab	ES	0	0	3	3	50	50	100	1.5
23CS3202	Applied Python Programming	ES	1	0	2	3	50	50	100	2
23CS3203	Object Oriented Programming using C++ Lab	PC	0	0	3	3	50	50	100	1.5
23MC0102	Environmental Science	MC	2	0	0	2	0	0	0	0
Total			**14**	**1**	**14**	**29**	**400**	**500**	**900**	**19.5**

II Year Course structure – CSE										
Semester –I										
CODE	SUBJECT NAME	Category	Periods				Sessional Marks	Semester end Exam marks	Total Marks	Credits
			L	T	P	Total				
23MA2104	Probability & Statistics	BS	2	1	0	3	40	60	100	3
23CS4111	Data Structures and Algorithms	PC	3	0	0	3	40	60	100	3
23CS4112	Operating Systems	PC	3	0	0	3	40	60	100	3
23CS4113	Data Communication Networks	PC	2	1	0	3	40	60	100	3
23CS4114	Object Oriented Programing using JAVA	PC	3	0	0	3	40	60	100	3
23CS4211	Data Structures and Algorithms Lab	PC	0	0	3	3	50	50	100	1.5
23CS4212	Operating Systems Lab	PC	0	0	3	3	50	50	100	1.5
23CS4214	Object Oriented Programing using JAVA Lab	PC	0	0	3	3	50	50	100	1.5
23CS9211	UI /UX Design Tools	SC	0	0	2	2	50	50	100	1
23CR9101	Logical Reasoning and Corporate Skills	HS	0	0	2	2	50	50	100	1
23MC0103	Financial Literacy	MC	2	0	0	2	0	0	0	0
Total			**15**	**2**	**13**	**30**	**500**	**450**	**950**	**21.5**

II Year Course structure – CSE										
Semester –II										
CODE	SUBJECT NAME	Category	Periods				Sessional Marks	Semester end Exam marks	Total Marks	Credits
			L	T	P	Total				
23MA2207	Mathematical Foundations in Computer Science	BS	2	1	0	3	40	60	100	3
23CS4115	Theory of Computation	PC	2	1	0	3	40	60	100	3
23CS4116	Database Management Systems	PC	3	0	0	3	40	60	100	3
23CS4117	Computer Organization and Microprocessor Interfacing	ES	2	1	0	3	40	60	100	3
23CS4118	Design and Analysis of Algorithms	PC	2	1	0	3	40	60	100	3
23CS4216	Database Management Systems Lab	PC	0	0	3	3	50	50	100	1.5
23CS4217	Computer Organization and Microprocessor Interfacing Lab	ES	0	0	3	3	50	50	100	1.5
23CS6211	Robotic Process Automation	JE	0	0	3	3	50	50	100	1.5
23CS9212	Data Analytics and Visualization	SC	0	0	2	2	50	50	100	1
23CR9102	Numerical Ability and Professional Communication Skills	HS	0	0	2	2	50	50	100	1
23MC0104	Entrepreneurship and Intellectual Property Rights	MC	2	0	0	2	0	0	0	0
Total			**13**	**4**	**13**	**30**	**500**	**450**	**950**	**21.5**

III Year Course structure – CSE										
Semester –I										
CODE	**SUBJECT NAME**	**Category**	**Periods**				**Sessional Marks**	**Semester end Exam marks**	**Total Marks**	**Credits**
			L	**T**	**P**	**Total**				
23DP6111	Open Elective- I	OE	3	0	0	3	40	60	100	3
23CS5111/ 23CS5112/ 23CS5113/ 23CS5114/ 23CS5115	Professional Elective-1	PE	3	0	0	3	40	60	100	3
23CS4119	Software Engineering	PC	3	0	0	3	40	60	100	3
23CS4120	Compiler Design	PC	3	0	0	3	40	60	100	3
23CS4121	Artificial Intelligence	PC	3	0	0	3	40	60	100	3
23CS4220	Compiler Design Lab	PC	0	0	3	3	50	50	100	1.5
23CS4221	Software Engineering Lab	PC	0	0	3	3	50	50	100	1.5
23CS9213	Full Stack Development	SC	0	0	2	2	50	50	100	1
23CR9103	Quantitative Aptitude and Effectual Communication Skills	HS	0	0	2	2	50	50	100	1
23CS9401	Summer Internship -I	PR	0	0	3	3	0	100	100	1.5
Total			**15**	**0**	**13**	**28**	**400**	**600**	**1000**	**21.5**

III Year Course structure – CSE										
Semester –II										
CODE	**SUBJECT NAME**	**Category**	**Periods**				**Sessional Marks**	**Semester end Exam marks**	**Total Marks**	**Credits**
			L	**T**	**P**	**Total**				
23DP6121	Open Elective- II	OE	3	0	0	3	40	60	100	3
23CS5121/ 23CS5122/ 23CS5123/ 23CS5124/ 23CS5125	Professional Elective-II	PE	3	0	0	3	40	60	100	3
23CS5131/ 23CS5132/ 23CS5133/ 23CS5134/ 23CS5135	Professional Elective-III	PE	3	0	0	3	40	60	100	3
23CS4122	Machine Learning	PC	3	0	0	3	40	60	100	3
23CS4123	Cryptography	PC	3	0	0	3	40	60	100	3
23CS5221/ 23CS5222/ 23CS5223/ 23CS5224/ 23CS5225	Professional Elective - II Lab	PE	0	0	3	3	50	50	100	1.5
23CS4222	Machine Learning Lab	PC	0	0	3	3	50	50	100	1.5
123CS4223	Cryptography Lab	PC	0	0	3	3	50	50	100	1.5
23CS9214	Cloud Technologies	SC	0	0	2	2	50	50	100	1
23CR9104	High Level Reasoning and Employability Skills	HS	0	0	2	2	50	50	100	1
Total			**15**	**0**	**13**	**28**	**450**	**550**	**1000**	**21.5**

IV Year Course structure – CSE										
Semester –I										
CODE	**SUBJECT NAME**	**Category**	**Periods**				**Sessional Marks**	**Semester end Exam marks**	**Total Marks**	**Credits**
			L	**T**	**P**	**Total**				
23DP6131	Open Elective- III	OE	3	0	0	3	40	60	100	3
23CS5141/ 23CS5142/ 23CS5143/ 23CS5144/ 23CS5145	Professional Elective –IV	PE	3	0	0	3	40	60	100	3
23CS5151/ 23CS5152/ 23CS5153/ 23CS5154/ 23CS5155	Professional Elective -V	PE	3	0	0	3	40	60	100	3
23CS4124	Deep Learning	PC	3	0	0	3	40	60	100	3
23HS2111/ 23HS2112 / 23HS2113 / 23HS2114/ 23HS2115	Human Science Elective - I	HE	3	0	0	3	40	60	100	3
23CS4224	Deep Learning Lab	PC	0	0	3	3	50	50	100	1.5
23CS9215	DevSecOps	SC	0	0	2	2	50	50	100	1
23CS9402	Summer Internship-II	PR	0	0	0	0	0	100	100	1.5
23CS9501	Project Phase – I	PR	0	0	3	3	50	150	200	3
Total			**15**	**0**	**8**	**23**	**350**	**650**	**1000**	**22**

IV Year Course structure – CSE										
Semester –II										
CODE	SUBJECT NAME	Category	Periods				Sessional Marks	Semester end Exam marks	Total Marks	Credits
			L	T	P	Total				
23DP6341	Open Elective- IV / MOOCS	OE	3	0	0	3	40	60	100	3
23CS9502	Project Phase – II	PR	0	0	6	6	100	200	300	10
Total			**3**	**0**	**6**	**9**	**140**	**260**	**400**	**13**

Professional Electives(PE)		
PE-I	23CS5111/ 23CS5112/ 23CS5113/ 23CS5114 / 23CS5115	Computer Graphics / Distributed Systems / Bigdata Analytics / Advanced Data Structures / Parallel Processing
PE-II	23CS5121/ 23CS5122/ 23CS5123/ 23CS5124 / 23CS5125	Internet of Things / Blockchain and Smart Contracts /Competitive Programming / Multimedia Animation and Design / Cyber Security
PE-III	23CS5131/ 23CS5132/ 23CS5133/ 23CS5134 / 23CS5135	Approximation Algorithms / Natural Language Processing / Network Security / Software Agile Methodologies/ Unmanned Ariel Vehicles
PE-IV	23CS5141/ 23CS5142/ 23CS5143/ 23CS5144 / 23CS5145	Social Network Analysis/ Human Computer Interaction/ Computer Vision/ Software Design Patterns / Game Programming
PE-V	23CS5151/ 23CS5152/ 23CS5153/ 23CS5154 / 23CS5155	Mobile Computing/ Augmented and Virtual Reality/ Ethical Hacking / Stream Analytics / Free Elective - 1

Human Science Elective(HE)		
HE-1	23HS2111 / 23HS2112 / 23HS2113 / 23HS2114/ 23HS2115	Operational Research / Optimization Techniques / Entrepreneurship & Start-ups / Social Engineering / Research Methodology

Open Electives(OE)	
OE-I	Software Engineering Fundamentals Artificial Intelligence in Engineering Applications Web Technologies Robotic Process Automation Fundamentals of DBMS
OE-II	Blockchain Technologies Cloud Computing Fundamentals of Internet of Things Introduction to Machine Learning Mobile Application Development
OE-III	Multi-Device Programming Foundations of Cyber Physical Systems Data Analytics and Visualization Introduction to Deep Learning Introduction to Drones
OE-IV	MOOCS

HONORS & MINORS

Artificial Intelligence Track - 1										
CODE	SUBJECT NAME	Category	Periods				Sessional Marks	Semester end Exam marks	Total Marks	Credits
			L	T	P	Total				
23CS8111	Advanced Artificial Intelligence	HR	3	0	2	5	40	60	100	4
23CS8112	Reinforcement Learning	HR	3	0	2	5	40	60	100	4
23CS8113	Video Analytics	HR	3	0	2	5	40	60	100	4
23CS8314	MOOCS	HR	0	0	0	0	0	100	100	4

Data Science Track -2										
CODE	SUBJECT NAME	Category	Periods				Sessional Marks	Semester end Exam marks	Total Marks	Credits
			L	T	P	Total				
23CS8121	Data Analytics and Visualization using Open Source Tools	HR	3	0	2	5	40	60	100	4
23CS8122	Statistical Programming for Data Science	HR	3	0	2	5	40	60	100	4
23CS8123	Data Streams and Analytics	HR	3	0	2	5	40	60	100	4
23CS8324	MOOCS	HR	0	0	0	0	0	100	100	4

Game Development Track - 3										
CODE	SUBJECT NAME	Category	Periods				Sessional Marks	Semester end Exam marks	Total Marks	Credits
			L	T	P	Total				
23CS8141	Interactive 3D Graphics and Animation	HR	3	0	2	5	40	60	100	4
23CS8142	Android Games Development	HR	3	0	2	5	40	60	100	4
23CS8143	Games and AI Techniques	HR	3	0	2	5	40	60	100	4
23CS8344	MOOCS	HR	0	0	0	0	0	100	100	4

Cyber Security Track -4										
CODE	SUBJECT NAME	Category	Periods				Sessional Marks	Semester end Exam marks	Total Marks	Credits
			L	T	P	Total				
23CS8151	Vulnerability Analysis And Penetration Testing	HR	3	0	2	5	40	60	100	4
23CS8152	Digital Forensics	HR	3	0	2	5	40	60	100	4
23CS8153	Cyber Physical Systems and Security	HR	3	0	2	5	40	60	100	4
23CS8354	MOOCS	HR	0	0	0	0	0	100	100	4

Software Engineering Track-5										
CODE	SUBJECT NAME	Category	Periods				Sessional Marks	Semester end Exam marks	Total Marks	Credits
			L	T	P	Total				
23CS8171	Agile Software Development	HR	3	0	2	5	40	60	100	4
23CS8172	Software Architecture and Scalability for Internet-of-Things	HR	3	0	2	5	40	60	100	4
23CS8173	Software Defined Networking	HR	3	0	2	5	40	60	100	4
23CS8374	MOOCS	HR	0	0	0	0	0	100	100	4

MINORS										
Programming Track - 1										
CODE	**SUBJECT NAME**	**Category**	**Periods**				**Sessional Marks**	**Semester end Exam marks**	**Total Marks**	**Credits**
			L	**T**	**P**	**Total**				
23CS7101	Database Management System	MR	3	0	2	5	40	60	100	4
23CS7102	Data Structures and Algorithms	MR	3	0	2	5	40	60	100	4
23CS7103	Competitive Programming	MR	3	0	2	5	40	60	100	4
23CS7104	MOOC	MR	3	0	2	5	0	0	100	4
Cyber Physical Systems Track -2										
CODE	**SUBJECT NAME**	**Category**	**Periods**				**Sessional Marks**	**Semester end Exam marks**	**Total Marks**	**Credits**
			L	**T**	**P**	**Total**				
23CS7106	Internet of Things	MR	3	0	2	5	40	60	100	4
23CS7107	Blockchain and Smart Contracts	MR	3	0	2	5	40	60	100	4
23CS7108	Security for Cyber Physical Systems	MR	3	0	2	5	40	60	100	4
23CS7109	MOOC	MR	3	0	2	5	0	0	100	4
Artificial Intelligence and Machine Learning Track-3										
CODE	**SUBJECT NAME**	**Category**	**Periods**				**Sessional Marks**	**Semester end Exam marks**	**Total Marks**	**Credits**
			L	**T**	**P**	**Total**				
23CS7111	Artificial Intelligence in Engineering Applications	MR	3	0	2	5	40	60	100	4
23CS7112	Machine Learning	MR	3	0	2	5	40	60	100	4
23CS7113	Fundamentals of Deep Learning	MR	3	0	2	5	40	60	100	4
23CS7114	MOOC	MR	3	0	2	5	0	0	100	4
Advanced Tools Track-4										
CODE	**SUBJECT NAME**	**Category**	**Periods**				**Sessional Marks**	**Semester end Exam marks**	**Total Marks**	**Credits**
			L	**T**	**P**	**Total**				
23CS7116	Data Analytics and Visualization Tools	MR	3	0	2	5	40	60	100	4
23CS7117	Robotic Process Automations Tools	MR	3	0	2	5	40	60	100	4
23CS7118	Full Stack Development	MR	3	0	2	5	40	60	100	4
23CS7119	MOOC	MR	3	0	2	5	0	0	100	4