Annexure-A3

SCHEME and SYLLABUS

(Choice Based Credit Scheme)

For

BACHELOR OF TECHNOLOGY PROGRAM

In

COMPUTER SCIENCE & ENGINEERING (w.e.f. session 2022-2026)

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

SCHOOL OF ENGINEERING & TECHNOLOGY

RAFFLES UNIVERSITY

NEEMRANA

RAFFLES UNIVERSITY

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

VISION

To be a centre of excellence by producing high calibre, competent and self-reliant computer Science engineers, who possess scientific temperament and would engage in activities relevant to industries with ethical values and flair to research.

MISSION

- To provide efficient engineers for global requirements by imparting quality education.
- To explore, create and develop innovations in various aspects of engineering through industries and institutions.
- To emphasize on practical skills and socially relevant technology

ABOUT THE PROGRAM

Raffles University, Neemrana established in 2011, to produce highly practical oriented personnel in fields of engineering, management and law to meet specific manpower requirements of industries. Computer Science & Engineering Department was started in 2014 and has been conducting B.Tech Course in Computer Science & Engineering of 4-Years duration since 2014. Students are admitted through university entrance and direct counselling nominated by university management in 1st Year and 2nd year through lateral entry entrance test. The total intake for the B.Tech programme is 60. Besides under graduate degree courses, it is also running M.Tech Computer Science & Engineering Course (with specialization in Software Engineering and Artificial Intelligence) and Ph.D. The Department has three storey building and two instructional computer labs, Class rooms equipped with projectors, all faculty research labs have latest state of art computers, Auditorium and Conference Room. It has excellent and distinguished faculty. The various syllabi of UG/PG courses in Computer Science & Engineering Department, has been prepared with active participation from Industry. The Department is organizing number of expert lectures from industry experts for students in every semester. Summer training/ Industry Internship is mandatory for every B.Tech student after completion of second year and third year (Two times in 4 years). Emphasis has been given on project work and Lab Course for skill enhancement of students. Choice based credit system allows students to study the subjects of his/her choice from a number of elective courses /audit courses.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO-1: To train students with practical skills and experimental practices related to core and applied areas of Computer Science & Engineering to expand their knowledge horizon beyond books.

PEO-2: Graduate will establish himself/herself as effective professionals by solving real world problems using investigative and analytical skills along with the knowledge acquired in the field of Computer Science and Engineering.

PEO-3: To improve team building, team working and leadership skills of the students with high regard for ethical values and social responsibilities.

PEO- 4: Graduate will embrace professional code of ethics in the profession while deliberately being part of projects which contributes to the society at large without disturbing the ecological balance.

PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

1) Engineering Knowledge: Apply knowledge of mathematics, science, engineering fundamentals, and computer science & engineering to the solution of engineering problems.

2) Problem Analysis: Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

3) Design /Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.

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 information to provide valid conclusions.

5) Modern Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6) The Engineer and Society: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.

7) Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development.

8) Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9) Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

10) 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.

11) Project Management and Finance: Demonstrate knowledge and understanding of 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.

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 OUTCOMES (PSOs):

1) To collect requirements, analyze, design, implement and test software Systems.

2) To analyze the errors and debug them within minimal time.

SYNOPSIS OF SCHEME OF STUDIES & EXAMINATIONS

B.TECH SCHEME CREDITS CALCULATION

S.No.	Category of Course	Abbreviation Used	Credits
1.	Humanities and Social Sciences including Management Courses	HSMC	15
2.	Basic Sciences Courses	BSC	26
3.	Engineering Sciences Courses including workshop, Drawing, Basics of Electrical/ Mechanical/ Computer etc.	ESC	26
4.	Professional Core Courses	PCC	91
5.	Professional Elective Courses relevant to chosen specialization/ branch	PEC	24
6.	Open Subjects- Electives from other technical and /or emerging subjects	OEC	9
7.	Project Work, Seminar and internship in industry or elsewhere	PROJ	20
8.	Mandatory Courses (Environmental Sciences, Induction Program, Indian Constitution, Essence of Indian Traditional Knowledge)	MC	Non Credit
Total			**211**

Abbreviations Used:

L - Lecture
T - Tutorial
P - Practical

IA - Internal Assessment
EA - External Assessment

TA - Teacher's Assessment
MTA - Mid Tern Assessment
ETA - End Term Assessment

PROFESSIONAL CORE COURSE (PCC)

S.No	Subject Code No.	Subject	Preferred Semester	Credit
1	PCC-CSE 201	Data structure & algorithm using C	III	4
2	PCC-CSE 202	Object oriented programming through C++	III	4
3	PCC-CSE 203	Database Management System	III	4
4	PCC-CSE 204	Unix & Shell Programming	III	4
5	PCC-CSE 205	Data structure & algorithm Using C Lab	III	1
6	PCC-CSE 206	Object oriented programming through C++ Lab	III	1
7	PCC-CSE 207	Database Management System Lab	III	1
8	PCC-CSE 208	Unix & Shell Programming Lab	III	1
9	PCC-CSE 209	Digital Electronics	IV	4
10	PCC-CSE 210	Discrete Mathematics	IV	4
11	PCC-CSE 211	Computer Organization & Architecture	IV	4
12	PCC-CSE 212	Design & Analysis of the Algorithm	IV	4
13	PCC-CSE 213	Operating Systems	IV	4
14	PCC-CSE 214	Computer Organization & Architecture Lab	IV	1
15	PCC-CSE 215	Operating Systems Lab	IV	1
16	PCC-CSE 216	Design & Analysis of Algorithm Lab	IV	1
17	PCC-CSE 301	Data Communication	V	4
18	PCC-CSE 302	Software Engineering	V	4
19	PCC-CSE 303	Formal Language & Automata Theory	V	4
20	PCC-CSE 304	Java Programming	V	4
21	PCC-CSE 305	Software Engineering Lab	V	1
22	PCC-CSE 306	Java Programming Lab	V	1
23	PCC-CSE 307	Data Communication Lab	V	1
24	PCC-CSE 308	Compiler Design	VI	4
25	PCC-CSE 309	Data Mining & Warehousing	VI	4
26	PCC-CSE 310	Computer Network	VI	4
27	PCC-CSE 311	Compiler Design Lab	VI	1
28	PCC-CSE 312	Computer Network Lab	VI	1
29	PCC-CSE 401	Network Security & Cryptography	VII	4
30	PCC-CSE 402	Network Security & Cryptography Lab	VII	1
31	PCC-CSE 403	Advanced Computer Architecture	VIII	4
32	PCC-CSE 404	Artificial Intelligence & Expert Systems	VIII	4
33	PCC-CSE 405	Artificial Intelligence & Expert Systems Lab	VIII	2

PROFESSIONAL ELECTIVE COURSE (PEC)

S.No	Subject Code No.	Subject	Preferred Semester	Credit
1	PEC-CSE 301	Soft Computing	V	4
2	PEC-CSE 302	Image Processing	V	4
3	PEC-CSE 303	Embedded System	V	4
4	PEC-CSE 304	Distributed Systems	VI	4
5	PEC-CSE 305	Theory of Computation	VI	4
6	PEC-CSE 306	Speech and Natural Language Processing	VI	4
7	PEC-CSE 307	Advanced Operating Systems	VI	4
8	PEC-CSE 308	Real Time Systems	VI	4
9	PEC-CSE 309	Web and Internet Technology	VI	4
10	PEC-CSE 401	Data Analytics	VII	4
11	PEC-CSE 402	Parallel and Distributed Algorithms	VII	4
12	PEC-CSE 403	Neural Networks and Deep Learning	VII	4
13	PEC-CSE 404	Multi-Agent Intelligent Systems	VII	4
14	PEC-CSE 405	Internet-of-Things	VII	4
15	PEC-CSE 406	Cloud Computing	VII	4
16	PEC-CSE 407	Optimization Techniques	VIII	4
17	PEC-CSE 408	Human Computer Interaction	VIII	4
18	PEC-CSE 409	Digital Signal Processing	VIII	4

OPEN ELECTIVE COURSE (OEC)

S.No	Subject Code No.	Subject	Preferred Semester	Credit
1	OEC-CSE 301	Management of Employee Performance	VI	3
2	OEC-CSE 302	Cyber Laws and Ethics	VI	3
3	OEC-CSE 303	Non-Conventional Energy Sources	VI	3
4	OEC-CSE 401	Economics Polices in India	VII	3
5	OEC-CSE 402	Reliability and Maintenance Engineering	VII	3
6	OEC-CSE 403	Management Training and Development	VII	3
7	OEC-CSE 404	Human Resource Management	VIII	3
8	OEC-CSE 405	Total Quality Management	VIII	3
9	OEC-CSE 406	Industrial Relations	VIII	3

BASIC SCIENCE COURSES (BSC)

S.No	Subject Code No.	Subject	Preferred Semester	Credit
1	BSC-101	Engineering Physics-I	I	4
2	BSC-102	Engineering Mathematics-I	I	4
3	BSC-103	Physics-I Lab	I	1
4	BSC-104	Engineering Physics-II	II	4
5	BSC-105	Engineering Mathematics-II	II	4
6	BSC-106	Engineering Chemistry	II	3
	BSC-107	Engineering Physics-II Lab	II	1
7	BSC-108	Engineering Chemistry Lab	II	1
8	BSC-201	Mathematics-III	III	4

ENGINEERING SCIENCE COURSE (ESC)

S.No	Subject Code No.	Subject	Preferred Semester	Credit
1	ESC-101	Computer Fundamental	I	4
2	ESC-102	Basics of Mechanical Engineering	I	4
3	ESC-103	Workshop Practice Lab	I	2
4	ESC-104	Computer Fundamental Lab	I	1
5	ESC-105	Programming with C	II	3
6	ESC-106	Basics of Electrical & Electronics Engineering	II	4
7	ESC-107	Engineering Mechanics	II	4
8	ESC-108	Basics of Electrical & Electronics Engineering Lab	II	1
9	ESC-109	Engineering Graphics & Design Lab	II	2
10	ESC-110	C Programming Lab	II	1

HUMANITIES & SOCIAL SCIENCES INCLUDING MANAGEMENT

S.No	Subject Code No.	Subject	Preferred Semester	Credit
1	HSMC 101	Communicative English	I	3
2	HSMC 102	Language Lab	I	1
3	HSMC 201	Human Values	III	4
4	HSMC 401	Organizational Behaviour	IV	4
5	HSMC-CSE 301	Human Resource Management	V	3

PROJECT WORK, SEMINAR AND INTERNSHIP IN INDUSTRY OR ELSEWHERE

S.No	Subject Code No.	Subject	Preferred Semester	Credit
1	PROJ-CSE 301	Industrial Training Seminar	V	2
2	PROJ-CSE-302	Minor Project-I	VI	2
3	PROJ-CSE-401	Minor Project-II	VII	8
4	PROJ-CSE-402	Major Project	VIII	8

MANDATORY COURSES

S.No	Subject Code No.	Subject	Preferred Semester	Credit
1	MC-I	Environmental Studies	I	0
2	MC-II	Environmental Studies Lab	I	0
3	MC-III	Constitutional Law	III	0

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School of Engineering and Technology

CBCS Scheme for B.Tech (4 Year Course)(2022-26)

Department of Computer Science & Engineering

3rd Semester

S.No.	Category	Code	Course Title	Hours Per Week			IA		EA	Total	Credit
				L	T	P	TA	MTA			
1	PCC	PCC-CSE 201	Data structure & algorithm using C	3	1	0	20	20	60	100	4
2	PCC	PCC-CSE 202	Object oriented programming through C++	3	1	0	20	20	60	100	4
3	PCC	PCC-CSE 203	Database Management System	3	1	0	20	20	60	100	4
4	PCC	PCC-CSE 204	Unix & Shell Programming	3	1	0	20	20	60	100	4
5	BSC	BSC 201	Mathematics –III	3	1	0	20	20	60	100	4
6	HSMC	HSMC 201	Human Values	3	1	0	20	20	60	100	4
7	PCC	PCC-CSE 205	Data structure & algorithm Using C Lab	0	0	2	30	30	40	100	1
8	PCC	PCC-CSE 206	Object oriented programming through C++ Lab	0	0	2	30	30	40	100	1
9	PCC	PCC-CSE 207	Database Management System Lab	0	0	2	30	30	40	100	1
10	PCC	PCC-CSE 208	Unix & Shell Programming Lab	0	0	2	30	30	40	100	1
			Total	**18**	**6**	**8**				**1000**	**28**

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CBCS Scheme for B.Tech (4 Year Course) (2022-26)

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4th Semester

S.No.	Category	Code	Course Title	Hours Per Week			IA		EA	Total	Credit
				L	T	P	TA	MTA			
1	PCC	PCC-CSE 209	Digital Electronics	4	1	0	20	20	60	100	5
2	PCC	PCC-CSE 210	Discrete Mathematics	3	1	0	20	20	60	100	4
3	PCC	PCC-CSE 211	Computer Organization & Architecture	3	0	0	20	20	60	100	3
4	PCC	PCC-CSE 212	Design & Analysis of Algorithm	4	0	0	20	20	60	100	4
5	PCC	PCC-CSE 213	Operating Systems	4	0	0	20	20	60	100	4
6	HSMC	HSMC 401	Organizational Behaviour	3	0	0	20	20	60	100	3
7	PCC	PCC-CSE 214	Computer Organization & Architecture Lab	0	0	2	30	30	40	100	1
8	PCC	PCC-CSE 215	Operating Systems Lab	0	0	2	30	30	40	100	1
9	PCC	PCC-CSE 216	Design & Analysis of Algorithm Lab	0	0	2	30	30	40	100	1
10	MC	MC-III	Constitutional Law	0	0	0	0	0	100	100	0
			Total	**21**	**2**	**6**				**1000**	**26**

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Department of Computer Science & Engineering

5th Semester

S.No.	Category	Code	Course Title	Hours Per Week			IA		EA	Total	Credit
				L	T	P	TA	MTA			
1	PCC	PCC-CSE 301	Data Communication	4	0	0	20	20	60	100	4
2	PCC	PCC-CSE 302	Software Engineering	4	0	0	20	20	60	100	4
3	PCC	PCC-CSE 303	Formal Language & Automata Theory	3	1	0	20	20	60	100	4
4	PCC	PCC-CSE 304	Java Programming	3	0	0	20	20	60	100	3
5	HSMC	HSMC-CSE-301	Human Resource Management	3	0	0	20	20	60	100	3
6	PEC	PEC-CSE 301-303	Elective – I	4	0	0	20	20	60	100	4
7	PCC	PCC-CSE 305	Software Engineering Lab	0	0	2	30	30	40	100	1
8	PCC	PCC-CSE 306	Java Programming Lab	0	0	2	30	30	40	100	1
9	PCC	PCC-CSE 307	Data Communication Lab	0	0	2	30	30	40	100	1
10	PROJ	PROJ-CSE 301	Industrial Training/ Project Seminar	0	0	4	0	0	100	100	2
			Total	**21**	**1**	**10**				**1000**	**27**

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Department of Computer Science & Engineering

6th Semester

S.No.	Category	Code	Course Title	Hours Per Week			IA		EA	Total	Credit
				L	T	P	TA	MTA			
1	PCC	PCC-CSE 308	Compiler Design	3	1	0	20	20	60	100	4
2	PCC	PCC-CSE 309	Data Mining & Ware-housing	3	0	0	20	20	60	100	3
3	PCC	PCC-CSE 310	Computer Network	3	0	0	20	20	60	100	3
4	PEC	PEC-CSE 304-306	Elective-II	4	0	0	20	20	60	100	4
5	PEC	PEC-CSE 307-309	Elective-III	4	0	0	20	20	60	100	4
6	OEC	OEC-CSE 301-303	Open Elec-tive-I	3	0	0	20	20	60	100	3
7	PCC	PCC-CSE 311	Compiler Design Lab	0	0	2	30	30	40	100	1
8	PCC	PCC-CSE 312	Computer Network Lab	0	0	2	30	30	40	100	1
9	PROJ	PROJ-CSE 302	Minor Pro-ject- I	0	0	4	50	50	100	200	2
			Total	**20**	**1**	**8**				**1000**	**25**

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7th Semester

S.No.	Category	Code	Course Title	Hours Per Week			IA		EA	Total	Credit
				L	T	P	TA	MTA			
1	PCC	PCC-CSE 401	Network Security & Cryptography	3	1	0	20	20	60	100	4
2	PEC	PEC-CSE 401-403	Elective- IV	4	0	0	20	20	60	100	4
3	PEC	PEC-CSE 404-406	Elective- V	3	1	0	20	20	60	100	4
4	OEC	OEC-CSE 401-403	Open Elective- II	3	0	0	20	20	60	100	3
5	PCC	PCC-CSE 401	Network Security & Cryptography Lab	0	0	2	30	30	40	100	1
6	PROJ	PROJ-CSE-401	Minor Project-II	0	0	16	50	50	400	500	8
			Total	**13**	**1**	**18**				**1000**	**24**

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CBCS Scheme for B.Tech (4 Year Course) (2022-26)

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8th Semester

S.No.	Category	Code	Course Title	Hours Per Week			IA		EA	Total	Credit
				L	T	P	TA	MTA			
1	PCC	PCC-CSE 403	Advanced Computer Architecture	3	1	0	20	20	60	100	4
2	PCC	PCC-CSE 404	Artificial Intelligence & Expert Systems	3	0	0	20	20	60	100	3
3	PEC	PEC-CSE 407- 409	Elective- VI	3	1	0	20	20	60	100	4
4	OEC	OEC-CSE 404-406	Open Elective- III	3	0	0	20	20	60	100	3
5	PCC	PCC-CSE 405	Artificial Intelligence & Expert Systems Lab	0	0	4	30	30	40	100	2
6	PROJ	PROJ-CSE-402	Major Project	0	0	16	50	150	400	600	8
			Total	**12**	**2**	**20**				**1100**	**24**