

PROGRAM ELECTIVE IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	AIT 416	i. OPTIMIZATION TECHNIQUES IN ARTIFICIAL INTELLIGENCE	2-1-0	3	3
	AIT 426	ii. MINING OF MASSIVE DATASETS	2-1-0		
	CST 436	iii. PARALLEL COMPUTING	2-1-0		
	CST 446	iv. DATA COMPRESSION TECHNIQUES	2-1-0		
	AIT 456	v. INTRODUCTION TO REINFORCEMENT LEARNING	2-1-0		
	CST 466	vi. DATA MINING	2-1-0		
	AIT 476	vii. BIO-INSPIRED OPTIMIZATION TECHNIQUES	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	CST 418	i. HIGH PERFORMANCE COMPUTING	2-1-0	3	3
	CST 428	ii. BLOCK CHAIN TECHNOLOGIES	2-1-0		
	CST 438	iii. IMAGE PROCESSING TECHNIQUE	2-1-0		
	CST 448	iv. INTERNET OF THINGS	2-1-0		
	AIT 458	v. SPEECH PROCESSING AND ANALYTICS	2-1-0		
	CST 468	vi. BIOINFORMATICS	2-1-0		
	CST 478	vii. COMPUTATIONAL LINGUISTICS	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. **Comprehensive Viva Voce:** The comprehensive viva voce in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the core subjects studied from third to eighth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semesters. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practicing questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.
3. **Project Phase II:** The objective of Project Work Phase II & Dissertation is to enable the student to extend further the investigative study taken up in Project Phase I, either fully theoretical/practical or involving both theoretical and practical work, under the mentoring of a Project Guide from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment shall normally include:
 - In depth study of the topic assigned in the light of the Report prepared under Phase I;
 - Review and finalization of the Approach to the Problem relating to the assigned topic;
 - Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;
 - Final development of product/process, testing, results, conclusions and future directions;
 - Preparing a paper for Conference presentation/Publication in Journals, if possible;
 - Preparing a Dissertation in the standard format for being evaluated by the Department;
 - Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75	
Guide	: 30
Interim evaluation, 2 times in the semester by a committee	: 50
Quality of the report evaluated by the above committee	: 30

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor).

Final evaluation by the final evaluation committee : 40

(The final evaluation committee comprises Project coordinator, expert from Industry/research Institute and a senior faculty from a sister department. The same committee will conduct Comprehensive for 50 marks).

MINOR

Minor is an additional credential a student may earn if she/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B. Tech degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist bucket of 3-6 courses is identified for each Minor. Each bucket may rest on one or more foundation courses. A bucket may have sequences within it, i.e., advanced courses may rest on basic courses in the bucket. She/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as “Bachelor of Technology in xxx with Minor in yyy”. The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

- (i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by M slot courses.
- (ii) Registration is permitted for Minor at the beginning of third semester. Total credits required to award B. Tech with Minor is 182 (162 +20)
- (iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses, of which one course shall be a mini project based on the chosen area. They can do mini project either in S7 or in S8. The remaining 8 credits could be acquired through 2 MOOCs recommended by the Board of Studies and approved by the Academic Council or 2 courses from the minor buckets listed here. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.
- (iv) There won't be any supplementary examination for the courses chosen for Minor.
- (v) On completion of the program, “Bachelor of Technology in xxx with Minor in yyy” will be awarded if the registrant earn 20 credits form the minor courses.

The registration for minor program will commence from semester 3 and all the academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 5 buckets. The bucket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the bucket. Reshuffling of courses between various buckets will not be allowed. There is option to skip any two courses listed here and to opt for equivalent MOOC courses approved by the Academic Council. In any case, they should carry out a mini project based on the chosen area in S7 or S8. For example: Students who have registered **B.Tech Minor in Artificial Intelligence** can opt to study the courses listed in minor baskets under Computer Science & Engineering Programme.

HONOURS

Honours is an additional credential a student may earn if she/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of a class. The University is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to *gain expertise/get specialized* in an area inside his/her major B. Tech discipline and to enrich knowledge in emerging/advanced areas in the concerned branch of engineering. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as “Bachelor of Technology in xxx, with Honours.” The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If a student is not earning credits for any one of the specified course for getting Honours, she/he is not entitled to get Honours. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 buckets, each bucket representing a particular specialization in the branch. The students shall select only the courses from same bucket in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

- (i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The Honours courses shall be identified by H slot courses.
- (ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 +20).
- (iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired through 2 MOOCs recommended by the Board of studies and approved by the Academic Council or 2 courses from the same bucket as the above 3 courses. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of ‘C’ or better for all courses under Honours.
- (iv) There won’t be any supplementary examination for the courses chosen for Honours.
- (v) On successful accumulation of credits at the end of the programme, “Bachelor of Technology in xxx, with Honours” will be awarded if overall CGPA is greater than or equal to 8.5, earned a grade of ‘C’ or better for all courses chosen for Honours and there is no history of ‘F’ Grade in the entire span of the B. Tech Course.
- (vi) The registration for Honours program will commence from semester 4 and the all academic units offering Honours in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 5 buckets, each bucket representing a particular specialization in the branch. The students shall

select only the courses from same bucket in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. There is option to skip any two courses listed here if required, and to opt for equivalent MOOC courses approved by the Academic Council. In any case, they should carry out a mini project based on the chosen area in S8. For example: Students who have registered for **B.Tech. in Artificial Intelligence with Honours** can opt to study the courses listed in one of the buckets shown below:

HONOURS BUCKETS												
SEMESTER	BUCKET-1				BUCKET-2				BUCKET-3			
	Specialization - Security in Computing				Specialization –Computational Biology				Specialization –Computer Vision			
	COURSE NO	COURSE NAME	HOURS	CREDITS	COURSE NO	COURSE NAME	HOURS	CREDITS	COURSE NO	COURSE NAME	HOURS	CREDITS
S4	CST 292	NUMBER THEORY	4	4	AIT 294	COMPUTATIONAL FUNDAMENTALS FOR BIOINFORMATICS	4	4	AIT 296	ADVANCED TOPICS IN COMPUTER GRAPHICS	4	4
S5	CST 393	CRYPTOGRAPHIC ALGORITHMS	4	4	AIT 395	COMPUTATIONAL BIOLOGY	4	4	AIT 397	ADVANCED CONCEPTS IN COMPUTER VISION	4	4
S6	CST 394	NETWORK SECURITY	4	4	AIT 396	MACHINE LEARNING IN COMPUTATIONAL BIOLOGY	4	4	AIT 398	IMAGE AND VIDEO PROCESSING	4	4
S7	CST 495	CYBER FORENSICS	4	4	AIT 497	COMPUTATIONAL HEALTH INFORMATICS	4	4	AIT 499	SURVEILLANCE VIDEO ANALYTICS	4	4
S8	AID 496	MINI PROJECT	4	4	AID 496	MINI PROJECT	4	4	AID 496	MINI PROJECT	4	4

Note: Name of the specialization shall be mentioned in the Honours Degree to be awarded

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed specifically for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social works and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batch-mates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics:** Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity:** Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork:** Develop a culture of teamwork and group communication.
- **Social Awareness:** Nurture a deeper understanding of the local and global world and our place in it as concerned citizens of the world.
- **Physical Activities & Sports:** Engage students in sports and physical activity to ensure healthy physical and mental growth.

