

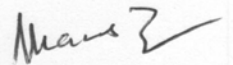
17 SEP 2014

Ref. No.: 20.../4...BCSE1765

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

Date: - 17.9.2014

Please refer to No. ADAC-1019 dated 12.8.2014 regarding offering Minor Areas, Departmental Specializations and Interdisciplinary Specializations for UG students under Capability-Linked Options. Required information from the Department of Computer Science & Engineering is attached herewith.



(Saroj Kaushik)  
Head, CS&E Deptt.

**Prof. Anurag Sharma**  
Dean Academics

# DEPARTMENT OF COMPUTER SCIENCE & ENGG

## A. Minor Area in CS for UG from other Department

1. **Title of the Module:** Minor Area in CS for Non CS UG Students
2. **Type of Module :** Minor Area Module
3. **Discipline Eligible to apply for the Module:**
  - All BTech and Dual students.
  - B.Tech and Dual Degree in Mathematics and Computing are not allowed.
4. **Maximum Number of Students:** 20
5. **Eligibility:** Students should have cleared COL 100 and COL106 with a minimum of B(-) grade in each of them .
6. **List of Courses that constitute 20-credit Module:**
  - COL100 will not be counted towards minor area.
  - COL106 will be counted towards minor requirement if not done as Core.
  - The student needs to do minimum of 3 of the department core (DC) courses listed below and remaining courses from department electives (see annexure).
  - Students may apply as per Institute norms

### Departmental Core (DC)

Table1

|    | Courses of Departmental Core                          | LTP   | Cr |
|----|-------------------------------------------------------|-------|----|
| 1  | COL 106: Data Structures & Algorithms                 | 3-0-4 | 5  |
| 2  | CSL 202: Discrete Structures                          | 3-1-0 | 4  |
| 3  | CSL 215: Digital Logic & Design                       | 3-0-4 | 5  |
| 4  | CSL 216: Computer Architecture                        | 3-0-2 | 4  |
| 5  | CSL 226: Programming Languages                        | 3-0-4 | 5  |
| 6  | CSP 290: Design Practices                             | 0-0-6 | 3  |
| 7  | CSL 331: Operating Systems                            | 3-0-4 | 5  |
| 8  | CSL 333: Principles of Artificial Intelligence*       | 3-0-2 | 4* |
| 9  | CSL 334: Computer Networks                            | 3-0-2 | 4  |
| 10 | CSL 351: Algorithm Design & Analysis                  | 3-1-0 | 4  |
| 11 | CSL 352: Intro to Automata & Theory of Computation    | 3-0-0 | 3  |
| 12 | CSL 362: Introduction to Database Management Systems* | 3-0-2 | 4* |
| 13 | CSL 380: Intro to Parallel & Distributed Programming  | 2-0-2 | 3  |

\* Note: One of CSL333 or CSL362 will be considered as part of DC another other will be treated as DE

## B. Specialization Modules for UG of CSE Dept

1. **Title of the Module:** Departmental Specialization Module for BTech in CS
2. **Type of Module :** Specialization in UG Programme
3. **Discipline Eligible to apply for the Module:** BTech of CSE
4. **Maximum Number of Students:** ---
5. **Eligibility:** As per Institute Norms.
6. **List of Courses that constitute 20-credit Module:**
  - Students may apply as per Institute norms

### Specializations offered

- Advanced Topics in CS
- Architecture & Embedded Systems (AES)
- Graphics & Vision (GV)
- Software Systems (SS)
- Theoretical Computer Science (TH)
- Data Analytics & AI (DAAI)
- Applications & IT (ITA)

### Overall Credit Requirements for B.Tech with Specialization in CS:

#### Institute Core (IC): 55 cr

- First Year common to all the students - 34 cr
- Courses in HU, Biology, Environment, - 21 cr

#### Non Graded Core (NGC) - 15 cr

- Core : 55 (IC)+ 55 (DC\*) + 14 (PL\_EAS) = 124 cr
- NGC: 15 cr (Non Graded Courses)

\* For DC, refer Table1 + BTP Part 1(0-0-12; 6cr)

**Overall Credit** =(Core + 31\* cr) + 15 cr (NGC)= (124+31) + 15 = 155 cr + 15 cr (NGC)

\* 31 credits = 12 cr (SC) + 19 cr (DE\*\*) of which at least 9 credits from specialization.

\*\* For DE, refer Annexure

**Total 155 cr + 15 Non-Graded**

#### SPECIALIZATION UG CORE (SC): 12 Cr

|   |                                     |        |           |
|---|-------------------------------------|--------|-----------|
| 1 | CSL703: Logic for Computer Science  | 3-0-2  | 4 cr      |
| 2 | CSP494: B.Tech Project Part 2       | 0-0-16 | 8 cr      |
|   | <b>Total Specialization UG Core</b> |        | <b>12</b> |

- In addition Project must be relevant to the specialization chosen.

## C. MTech in CS with Advance Standing

1. **Title of the Module:** MTech in CS with Advance Standing
2. **Type of Module :** MTech in CS with Advance Standing
3. **Discipline Eligible to apply for the Module:** Student can apply after 6th semester
  - All BTech students.
  - Dual Degree students of CSE & Maths are not permitted.
4. **Maximum Number of Students:** ---
5. **Normal period for completion:** 2 to 4 additional semesters depending on the background of the student
6. **Eligibility:** At the time of applying for advance MTech
  - Students should have cleared COL 100 and COL106 with a minimum of B(-) grade in each of them .
  - Students would be required to complete all the PG credit requirements of 48 credits out of which waiver of 6 OC credits from PG requirement is given.  
$$42PG \text{ credits} = 30 \text{ credits (PC for PG)} + 12 \text{ credits (PE for PG)}$$
  - In addition students would be required to clear all the UG prerequisite courses specified for the corresponding PG courses
  - Students would get waiver on all UG prerequisite courses completed as well as a maximum of 12 PG credits completed under any category in the UG programme
  - DRC/Admission committee would review the application and interview the candidate to assess his/her overall suitability after 6th semester.
  - Assistantship eligibility would be as per Institute norms i.e. 8 CGPA in the UG program or valid CS GATE score
7. **Overall Credit Requirements:** In addition to his/her own discipline UG credit requirements + UG prerequisites for CS PG courses + 42 PG credits as per the dual degree programme

## Annexure I: List of UG & PG Electives

- Course have been revised and numbers will be suitably mapped to numbers corresponding to new curriculum.

| Course Number & Title                                | Status | L-T-P | Credits | Status     | Stream     |
|------------------------------------------------------|--------|-------|---------|------------|------------|
| CSL341: Machine Learning                             | UG     | 3-0-2 | 4       | Existing   | DAAI       |
| CSP315: Embedded System Design Laboratory            | UG     | 0-1-6 | 4       | Revised    | AES        |
| CSR310: Professional Practices (CS)                  | UG     | 1-0-2 | 3       | Existing   |            |
| CSD300: DESIGN PROJECT                               | UG     | 0-0-4 | 2       | NON-GRADED |            |
| CSD310: Mini Project                                 | UG     | 0-0-6 | 3       | Existing   |            |
| CSS310: Independent Study (CS)                       | UG     | 0-3-0 | 3       | Existing   |            |
| CSL333: Principles of Artificial Intelligence*       | UG     | 3-0-2 | 4       | Revised    | DAAI & ITA |
| CSL362: Introduction to Database Management Systems* | UG     | 3-0-2 | 4       | Revised    | DAAI & ITA |
| CSL703: Logic for CS                                 | UG/PG  | 3-0-2 | 4       | Revised    | TH/Core    |
| CSL705: Theory of Computation                        | UG/PG  | 3-0-0 | 3       | Revised    | TH         |
| CSL718: Architecture of High Performance Computers   | UG/PG  | 3-0-2 | 4       | Existing   | AES        |
| CSL719: Synthesis of Digital Systems                 | UG/PG  | 3-0-2 | 4       | Existing   | AES        |
| CSL728: Compilers                                    | UG/PG  | 3-0-3 | 4.5     | Revised    | SS         |
| CSL729: Compiler Optimization                        | UG/PG  | 3-0-3 | 4.5     | New        | SS         |
| CSL724: Advanced Computer Networks                   | UG/PG  | 3-0-2 | 4       | Existing   | SS         |
| CSL726: Numerical Algorithms                         | UG/PG  | 3-0-2 | 4       | New        | TH         |
| CSL730: Parallel Programming                         | UG/PG  | 3-0-2 | 4       | Existing   | SS&TH      |
| CSL732: Virtualization and Cloud Computing           | UG/PG  | 3-0-0 | 3       | Existing   | SS         |
| CSL740: Software Engineering                         | UG/PG  | 3-0-2 | 4       | Existing   | SS         |
| CSD745: Minor Project                                | PG     | 0-0-6 | 4       | Existing   |            |
| CSL750: Foundations of Automatic Verification        | UG/PG  | 3-0-2 | 4       | Existing   | TH         |
| CSL751: Algorithmic Graph Theory                     | UG/PG  | 3-0-0 | 3       | Revised    | TH         |
| CSL752: Geometric Computing                          | UG/PG  | 3-0-0 | 3       | Revised    | TH         |
| CSL753: Complexity Theory                            | UG/PG  | 3-0-0 | 3       | Revised    | TH         |
| CSL754: Approximation Algorithms                     | UG/PG  | 3-0-0 | 3       | Revised    | TH         |
| CSL756: Mathematical Programming                     | UG/PG  | 3-0-0 | 3       | Revised    | TH         |
| CSL757: Model Centric Algorithm Design               | UG/PG  | 3-0-2 | 4       | New        | TH & ITA   |
| CSL758: Advanced Algorithms                          | UG/PG  | 3-0-2 | 4       | Existing   | TH         |
| CSL759: Cryptography & Computer Security             | UG/PG  | 3-0-0 | 3       | Revised    | TH         |
| CSL760: Advanced Data                                | UG/PG  | 3-0-2 | 4       | New        | DAAI & ITA |

|                                                        |       |       |     |          |            |
|--------------------------------------------------------|-------|-------|-----|----------|------------|
| Management                                             |       |       |     |          |            |
| CSL762: Database Implementation                        | UG/PG | 3-0-2 | 4   | Revised  | DAAI & ITA |
| CSL768: Wireless Networks                              | UG/PG | 3-0-2 | 4   | Existing | SS         |
| CSL770: Advanced AI                                    | UG/PG | 3-0-2 | 4   | New      | DAAI & ITA |
| CSL772: Natural Language Processing                    | UG/PG | 3-0-2 | 4   | New      | DAAI       |
| CSL774: Machine Learning                               | UG/PG | 3-0-2 | 4   | New      | DAAI       |
| CSL776: Learning Probabilistic Graphical Models        | UG/PG | 3-0-2 | 4   | New      | DAAI       |
| CSL780: Computer Vision                                | UG/PG | 3-0-2 | 4   | New      | GV         |
| CSL781: Computer Graphics                              | UG/PG | 3-0-3 | 4.5 | Existing | GV         |
| CSL783: Digital Image Analysis                         | UG/PG | 3-0-3 | 4.5 | Existing | GV         |
| CSL788: Embedded Computing                             | UG/PG | 3-0-0 | 3   | Revised  | AES        |
| CSL799: Independent Study                              | PG    | 0-3-0 | 3   | Existing | **         |
| CSL812: System Level Design and Modelling              | PG    | 3-0-0 | 3   | Existing | AES        |
| CSL818 Principles of Multiprocessor Systems            | PG    | 3-0-2 | 4   | Existing | AES        |
| CSL819: Advanced Distributed Systems                   | PG    | 3-0-2 | 4   | New      | SS         |
| CSL821: Reconfigurable Computing                       | PG    | 3-0-0 | 3   | Existing | AES        |
| CSL830: Distributed Computing                          | PG    | 3-0-0 | 3   | Existing | TH         |
| CSL831: Semantics of Programming Languages             | PG    | 3-0-0 | 3   | Existing | TH         |
| CSL832: Proofs and Types                               | PG    | 3-0-0 | 3   | Existing | TH         |
| CSL859: Advanced Computer Graphics                     | PG    | 3-0-2 | 4   | Existing | GV         |
| CSL860: Special Topics in Parallel Computation         | UG/PG | 3-0-0 | 3   | Existing | SS & TH    |
| CSL861: Special Topics in Hardware Systems             | UG/PG | 3-0-0 | 3   | Existing | AES        |
| CSL862: Special Topics in Software Systems             | UG/PG | 3-0-0 | 3   | Existing | SS         |
| CSL863: Special Topics in Theoretical Computer Science | UG/PG | 3-0-0 | 3   | Existing | TH         |
| CSL864: Special Topics in Artificial Intelligence      | UG/PG | 3-0-0 | 3   | Existing | DAAI       |
| CSL865: Special Topics in Computer Applications        | UG/PG | 3-0-0 | 3   | Existing | ITA        |
| CSL866: Special Topics in Algorithms                   | UG/PG | 3-0-0 | 3   | Existing | TH         |
| CSL867: Special Topics in High Speed Networks          | UG/PG | 3-0-0 | 3   | Existing | SS         |
| CSL868: Special Topics in Database Systems             | UG/PG | 3-0-0 | 3   | Existing | DAAI       |
| CSL869: Special Topics in Concurrency                  | UG/PG | 3-0-0 | 3   | Existing | DAAI & ITA |
| CSL870: Special Topics in Machine Learning             | UG/PG | 3-0-0 | 3   | New      | DAAI       |

|                                                                        |       |       |   |          |            |
|------------------------------------------------------------------------|-------|-------|---|----------|------------|
| CSL871: Special Topics in programming languages & Compilers            | UG/PG | 3-0-0 | 3 | New      | SS         |
| CSL872: Special Topics in Cryptography                                 | UG/PG | 3-0-0 | 3 | New      | TH         |
| CSV877: Special Module on Visual Computing                             | UG/PG | 1-0-0 | 1 | New      | GV         |
| CSV878: Special Module in Machine Learning                             | UG/PG | 1-0-0 | 1 | New      | DAAI       |
| CSV879: Special Module in Financial Algorithms                         | UG/PG | 2-0-0 | 2 | New      | TH         |
| CSV880: Special Module in Parallel Computation                         | UG/PG | 1-0-0 | 1 | Existing | SS         |
| CSV881: Special Module in Hardware Systems                             | UG/PG | 1-0-0 | 1 | Existing | AES        |
| CSV882: Special Module in Software Systems                             | UG/PG | 1-0-0 | 1 | Existing | SS         |
| CSV883: Special Module in Theoretical Computer Science                 | UG/PG | 1-0-0 | 1 | Existing | TH         |
| CSV884: Special Module in Artificial Intelligence                      | UG/PG | 1-0-0 | 1 | Existing | DAAI       |
| CSV885: Special Module in Computer Applications                        | UG/PG | 1-0-0 | 1 | Existing | ITA        |
| CSV886: Special Module in Algorithms                                   | UG/PG | 1-0-0 | 1 | Existing | TH         |
| CSV887: Special Module in High Speed Networks                          | UG/PG | 1-0-0 | 1 | Existing | SS         |
| CSV888: Special Module in Database Systems                             | UG/PG | 1-0-0 | 1 | Existing | DAAI & ITA |
| CSV889: Special Module in Concurrency                                  | UG/PG | 1-0-0 | 1 | Existing | DAAI & ITA |
| SIL765: Networks & System Security                                     | UG/PG | 3-0-2 | 4 | Existing | SS         |
| SIL769: Internet Traffic - Measurement, Modeling & Analysis            | UG/PG | 3-0-2 | 4 | Existing | SS & ITA   |
| SIL801: Special Topics in Multimedia System                            | UG/PG | 3-0-0 | 3 | Existing | GV & ITA   |
| SIL802: Special Topics in Web Based Computing                          | UG/PG | 3-0-0 | 3 | Existing | ITA        |
| SIV813: Applications of Computer in Medicines                          | UG/PG | 1-0-0 | 1 | Existing | ITA        |
| SIV861: Information and Comm Technologies for Development              | UG/PG | 1-0-0 | 1 | Existing | ITA        |
| SIV864: Special Module on Media Processing & Communication             | UG/PG | 1-0-0 | 1 | Existing | ITA        |
| SIV895: Special Module on Intelligent Information Processing           | UG/PG | 1-0-0 | 1 | Existing | ITA        |
| * The courses CSL333 and/or CSL362 can be done as DE if not done in DC |       |       |   |          |            |