Bachelor of Engineering (Computer Science) Curriculum
Elective Focus Areas and Elective Focus Criteria
For Students Admitted in Year 2014

1. Students can choose 5 electives from any elective focus areas.

2. If a student has read at least 3 courses from one elective focus area regardless of whether the courses are read as Technical Elective or Unrestricted Elective, he will be deemed to have attained elective focus in that particular area. **Students can exercise S/U for the Unrestricted Elective and it will still be counted towards the elective focus area.**

3. At any one semester, at least 2 elective courses will be offered. Special Topics to be mounted can vary depending on factors such as availability of faculty; availability of visiting staff with certain expertise; new technological trends, etc. Special Topics may also replace the listed elective courses.

4. The Elective Focus attained will be reflected as “Elective Focus” in the result transcript, e.g. Elective Focus in Digital Media.

5. Students can be awarded Elective Focus in at most two (2) areas.

<table>
<thead>
<tr>
<th>Areas of Elective Focus</th>
<th>Semester Offered</th>
<th>No. of Hours Per Week</th>
<th>AU</th>
<th>Pre-requisite</th>
</tr>
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<tbody>
<tr>
<td><strong>HIGH PERFORMANCE COMPUTING</strong></td>
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<tr>
<td>CE/CZ4011 Parallel Computing</td>
<td>√</td>
<td>2</td>
<td>1</td>
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<tr>
<td>CE/CZ4016 Advanced Topics in Algorithms</td>
<td>√</td>
<td>2</td>
<td>1</td>
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<tr>
<td>CE/CZ4013 Distributed Systems</td>
<td>√</td>
<td>2</td>
<td>1</td>
<td>1</td>
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<tr>
<td>CE/CZ4015 Simulation and Modelling</td>
<td>√</td>
<td>2</td>
<td>1</td>
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<tr>
<td>CE/CZ4012 Cloud Computing and its Applications (Special Topic)</td>
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<tr>
<td>CE/CZ4014 Programming Massively Parallel Processors (Special Topic)</td>
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<tr>
<td>Computability Theory (Special Topic)</td>
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<tr>
<td><strong>DIGITAL MEDIA</strong></td>
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<tr>
<td>CE/CZ4003 Computer Vision</td>
<td>√</td>
<td>2</td>
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<tr>
<td>CE/CZ4004 3D Modelling and Animation</td>
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<td>CE/CZ4001 Augmented and Virtual Reality</td>
<td>√</td>
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<tr>
<td>CE/CZ4002 Visual Media Compression and Processing</td>
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### Real Time Signal Processing (Special Topic)

<table>
<thead>
<tr>
<th>SEM 1</th>
<th>SEM 2</th>
<th>Pre-requisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
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### Audio and Speech Processing (Special Topic)

<table>
<thead>
<tr>
<th>SEM 1</th>
<th>SEM 2</th>
<th>Pre-requisite</th>
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</thead>
<tbody>
<tr>
<td>2</td>
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#### NETWORKING & MOBILITY

<table>
<thead>
<tr>
<th>Course</th>
<th>SEM 1</th>
<th>SEM 2</th>
<th>Pre-requisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE/CZ4022 Personal Mobile Networks</td>
<td>✓</td>
<td></td>
<td>3 CE3005 or CZ3006</td>
</tr>
<tr>
<td>CE/CZ4023 Advanced Computer Networks</td>
<td>✓</td>
<td></td>
<td>3 CE3005 or CZ3006</td>
</tr>
<tr>
<td>CE/CZ4021 Pervasive Networks</td>
<td>✓</td>
<td></td>
<td>3 CE3005 or CZ3006</td>
</tr>
<tr>
<td>CE/CZ4024 Cryptography and Network Security</td>
<td>✓</td>
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<td>3 CE3005 or CZ3006</td>
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<tr>
<td>Multimedia Networking (Special Topic)</td>
<td></td>
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<td>3 CE3005 or CZ3006</td>
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#### INFORMATION SYSTEMS

<table>
<thead>
<tr>
<th>Course</th>
<th>SEM 1</th>
<th>SEM 2</th>
<th>Pre-requisite</th>
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<tbody>
<tr>
<td>CZ4031 Database System Principles</td>
<td>✓</td>
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<td>3 CZ2007</td>
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<tr>
<td>CZ4034 Information Retrieval</td>
<td>✓</td>
<td></td>
<td>3 CE/CZ2001</td>
</tr>
<tr>
<td>CZ4032 Data Analytics and Mining</td>
<td>✓</td>
<td></td>
<td>3 CE/CZ2001</td>
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<tr>
<td>CZ4033 Advanced Data Management</td>
<td>✓</td>
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<td>3 CZ4031</td>
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<tr>
<td>Social Analytics (Special Topic)</td>
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<td></td>
<td>3 CE/CZ2001</td>
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<tr>
<td>Software Testing and Performance Analysis</td>
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<td>3 CZ3002</td>
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<tr>
<td>(Special Topic)</td>
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<tr>
<td>Systems Security, Policy and Strategy</td>
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<td>3 CE/CZ1001</td>
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<tr>
<td>(Special Topic)</td>
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#### INTELLIGENT SYSTEMS

<table>
<thead>
<tr>
<th>Course</th>
<th>SEM 1</th>
<th>SEM 2</th>
<th>Pre-requisite</th>
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<tbody>
<tr>
<td>CZ4041 Machine Learning</td>
<td>✓</td>
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<tr>
<td>CZ4046 Intelligent Agents (Special Topic)</td>
<td>✓</td>
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<td>3 -</td>
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<tr>
<td>CZ4042 Neural Networks</td>
<td>✓</td>
<td></td>
<td>3 -</td>
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<tr>
<td>CZ4043 Decision Support Systems</td>
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<td>3 CZ2007 and CZ3005</td>
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<tr>
<td>CZ4044 Business Intelligence</td>
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<tr>
<td>CZ4045 Natural Language Processing (Special</td>
<td>✓</td>
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<td>3 CE/CZ2001</td>
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<td>Topic)</td>
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#### INFORMATION AND CYBER SECURITY

<table>
<thead>
<tr>
<th>Course</th>
<th>SEM 1</th>
<th>SEM 2</th>
<th>Pre-requisite</th>
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</thead>
<tbody>
<tr>
<td>CE/CZ4062 Computer Security (System Security)</td>
<td>✓</td>
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<td>3 CE/CZ2005</td>
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<tr>
<td>CE/CZ4064 Security Management</td>
<td>✓</td>
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<td>3 CE/CZ2006</td>
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<tr>
<td>CE/CZ4065 Digital Forensics</td>
<td>✓</td>
<td></td>
<td>3 CE/CZ1001 or MH1812</td>
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<tr>
<td>CE/CZ4024 Cryptography and Network Security</td>
<td>✓</td>
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<td>3 CE3005 or CZ3006</td>
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* Check NTULearn for details on lab and example classes.