Streaming Talk for CEG2 Students (CEG3 in AY2015/16)

26 March 2015, 1 pm @ LT1

A/Prof Bharadwaj Veeravalli (elebv@nus.edu.sg)
CEG2 & CEG3 Coordinator
Joint Academic Committee (JAC)
Department of Electrical & Computer Engineering (ECE)

Three groups of students going to CEG3 in AY2015/16

- CEG1, AY2013/14 intake
- Common Engineering, AY2013/14 intake
  (streamed to CEG2 in AY2014/15)
- CEG2 Poly, AY2014/15 intake
B.Eng. (CEG) Curriculum Structure
AY2014/15 intake

<table>
<thead>
<tr>
<th>University Level Requirements (ULR)</th>
<th>CEG Programme / Major Requirements</th>
<th>Unrestricted Elective Modules (UEM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 General Education Modules (GEMs) - 8 MCs</td>
<td>Faculty reqs: CS2101, EG2401 &amp; HR2002 - 10 MCs</td>
<td>16 MCs from any Faculty/School</td>
</tr>
<tr>
<td>1 Singapore Studies (SS) - 4 MCs</td>
<td>Level 1000 Mathematics, Science &amp; Technology - 30 MCs</td>
<td></td>
</tr>
<tr>
<td>2 Breadth modules outside of FoE &amp; SoC - 8 MCs</td>
<td>Other core modules - 38 MCs</td>
<td></td>
</tr>
<tr>
<td>Total MCs = 20</td>
<td>CEG core projects - 18 MCs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Industrial Attachment (6-months) - 12 MCs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CEG Technical Electives to satisfy Breadth and Depth requirements - 16 MCs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MCs = 124</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MCs = 16</td>
<td></td>
</tr>
</tbody>
</table>

Total (minimum) MCs for graduation = 160

- Refer to the respective File For Graduation (FFG) document at:
  [http://www.ceg.nus.edu.sg/students/FFG_Checklists.html](http://www.ceg.nus.edu.sg/students/FFG_Checklists.html)
### CEG Modular Requirements and Credits

#### CEG Modular Requirements

<table>
<thead>
<tr>
<th>Modular Requirements</th>
<th>MCs</th>
</tr>
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<tbody>
<tr>
<td><strong>UNIVERSITY LEVEL REQUIREMENTS</strong></td>
<td>20</td>
</tr>
<tr>
<td>General Education Modules Requirement (GEM)</td>
<td>8</td>
</tr>
<tr>
<td>- GEK1549 Critical Thinking &amp; Writing</td>
<td>4</td>
</tr>
<tr>
<td>- Subject Group B GEM (exempted)</td>
<td>4</td>
</tr>
<tr>
<td>Singapore Studies (SS) Module</td>
<td>4</td>
</tr>
<tr>
<td>Breadth: Modules Outside FoE and SoC</td>
<td>6</td>
</tr>
<tr>
<td>- 1 x ULR Breadth (exempted)</td>
<td>4</td>
</tr>
<tr>
<td><strong>UNRESTRICTED ELECTIVE MODULES</strong></td>
<td>16</td>
</tr>
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<tr>
<td><strong>PROGRAMME REQUIREMENTS</strong></td>
<td>124</td>
</tr>
<tr>
<td>Faculty Requirements</td>
<td>10</td>
</tr>
<tr>
<td>- CS1213 Effective Communication Skills (exempted)</td>
<td></td>
</tr>
<tr>
<td>- EG2401 Engineering Professionalism</td>
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</tr>
<tr>
<td>- HR2002 Human Capital in Organizations (exempted)</td>
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</tr>
<tr>
<td>- English*</td>
<td></td>
</tr>
<tr>
<td>CEG Core Modules</td>
<td>80</td>
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<tr>
<td>- CG1001 Introduction to Computer Engineering</td>
<td>2</td>
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<td>- CG1108 Electrical Engineering</td>
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CEG Concentrations and Technical Elective Modules

- What does streaming involve?
- What are the compulsory requirements?
- How are technical electives organised?
- CEG technical electives requirements
- Recommended study schedules

CEG Curriculum

- Year 1 & 2: Wide coverage of Math, Engineering, Computing and Scientific fundamentals.

- Year 3 & 4: Highly specialized courses that track the latest technology developments in the field.

- Enable CEG graduates to deal with computer engineering problems of today and face future challenges.
Streaming involves…

- Own choice of technical elective modules in year 3 & 4 (some choose to start in year 2)
- Choice of technical elective modules must satisfy the technical elective requirement
- Failure to meet the requirements can delay graduation!

CEG Concentrations and Technical Elective Modules

- What does streaming involve?
- **What are the compulsory requirements?**
- How are technical electives organised?
- CEG technical electives requirements
- Recommended study schedules
Compulsory Requirements

- **Core Modules***
  - CG3002 Embedded Systems Design Project
  - CG3207 Computer Architecture
  - CG4001 BEng Dissertation
  - EE3031 Innovation & Enterprise I
  - EE3204 Computer Communications Networks I
  - EG2401 Engineering Professionalism
  - HR2002 Human Capital in Organizations
  - Industrial Attachment [3-months internship OR Technical Elective]

* This is in addition to other modules that are usually taken in the lower years.

+ (at least) 12 MCs of Technical Elective modules to achieve Breadth and Depth in the B.Eng. programme.

CEG Concentrations and Technical Elective Modules

- What does streaming involve?
- What are the compulsory requirements?
- **How are technical electives organised?**
- CEG technical electives requirements
- Recommended study schedules
**Organisation of Technical Electives**

- The technical electives (TE) are organised into 6 different concentrations. Each concentration contains some breadth & depth modules.
- Breadth modules: Core to the area and provides broad understanding of concepts
- Depth modules: More specialised and provides greater depth & coverage
- Other modules hosted by CS or ECE may also be used as fulfilling CEG TE requirements. Generally, a level 3000 module will count as TE Breadth, while a level 4000 will count as TE Depth.
- CEG students CANNOT exercise S/U option on ALL (level 3/4000) modules hosted by FoE and SoC (regardless taken to fulfill TE or UE requirements).
- More than 50 modules (offered by CS/ECE) are available.
- Only THREE TEs (equivalent to 12 MCs) need to be taken over 3 or 4 semesters. Students from the Poly intake are encouraged to take more TEs (in lieu of IA).

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**Organisation of Technical Electives**

- There are changes in the technical electives (from last year):
  - change in semester in which a module is offered
  - change in pre-requisites
  - changes in title, code and syllabus
  - new / removal of technical elective

Refer to:
1. NUS Bulletin  
   [http://www.nus.edu.sg/registrar/nusbulletin/modulesearch.html](http://www.nus.edu.sg/registrar/nusbulletin/modulesearch.html)
2. the updated master-list of Technical Electives  
   [http://www.ceg.nus.edu.sg/students/third_year.html](http://www.ceg.nus.edu.sg/students/third_year.html)  
   (under ‘Academic Information/Useful Links’)
3. CEG TE page - [http://www.ceg.nus.edu.sg/students/ceg3TE/](http://www.ceg.nus.edu.sg/students/ceg3TE/)
CEG Breadth/Depth

- Specialisation in CEG is achieved through technical breadth/depth electives from the following concentrations:
  - Communications & Networking
  - Embedded Computing
  - Large-Scale Computing
  - Intelligent Systems
  - Interactive Digital Media
  - System-on-a-Chip Design

CEG Concentrations

**Communications & Networking**
- CG3204L Computer Networks Laboratory <no longer offered>
- CS3103 Computer Networks Practice <new>
- EE3131C Communication Systems
- CS4222 Wireless Networking Computing & Sensor Networks
- CS4226 Internet Architecture <new>
- CS4274 Mobile and Multimedia Networking <no longer offered>
- EE4113 Digital Communications & Coding
- EE4114 Optical Communications
- EE4210 Computer Communication Networks II

Example: CS3103 [Offer semester in AY15: pending]
- Pre-req is CS2105/EE3204
- Preclusion: EE4210

CEG students are precluded from CS2105.
- EE3204 (CEG Major/core requirement) is only offered in sem 1, and scheduled for Year 3.

EE3204 (sem 5) -> CS3103 (sem 7) -> CS4222 (sem 8)
EE3204 (sem 5) -> CS3103 (sem 6) -> CS4222 (sem 8)
CEG Concentrations

Embedded Computing
- CG3204L Computer Networks Laboratory <no longer offered>
- CS2107 Introduction to Information & System Security
- CS3103 Computer Networks Practice <new>
- CS3218 Multimodal Processing in Mobile Platforms
- CS3235 Computer Security
- CS4222 Wireless Networking Computing & Sensor Networks
- CS4274 Mobile and Multimedia Networking <no longer offered>
- EE4210 Computer Communication Networks II
- EE4214 Real-time Embedded Systems
- EE4218 Embedded Hardware Systems Design
- EE4415 Integrated Digital Design

Large-Scale Computing
- CS2010 Data Structures & Algorithms II
- CS2102 Database Systems
- CS2107 Introduction to Information & System Security
- CS3211 Parallel and Concurrent Programming
- CS3235 Computer Security
- CS3223 Database Systems Implementation
- CS4221 Database Design
- CS4223 Multi-Core Architectures
- CS4224 Distributed Database
- CS4345 General-Purpose Computation on GPU
- EE4210 Computer Communication Networks II

Example: CS4224 [Pre-req change]
- AY13: CS2102
- AY14: CS3223 or CS2102
- AY15: CS3223 (strictly!)

CS1020 (sem 2) -> CS2010 & CS2102 (sem 3/4/5) -> CS3223 (sem 6) -> CS4224 (sem 7)
CEG Concentrations

Intelligent Systems
CS2010 Data Structures & Algorithms II
CS3240 Interaction Design
CS3243 Introduction to Artificial Intelligence
CS3244 Machine Learning
EE3206 Introduction to Computer Vision and Image Processing
EE3331C Feedback Control Systems
CS4244 Knowledge-based systems <new>
CS4246 AI Planning and Decision Making <new>
CS4248 Natural Language Processing
EE4212 Computer Vision
EE4213 Image & Video Processing <not offered in AY15>
EE4305 Introduction to Fuzzy/Neural Systems
EE4306 Distributed Autonomous Robotics Systems
EE4307 Control Systems Design and Simulation

Interactive Digital Media
CS2108 Introduction to Media Computing <new>
CS3240 Interaction Design
CS3241 Computer Graphics
CS3242 3D Modeling and Animation
CS3247 Game Development
CS3249 User Interface Development
EE3206 Introduction to Computer Vision and Image Processing
EE3331C Feedback Control Systems
EE3731C Signal Processing Methods <new>
EE3701 Digital Media Technologies
CS4247 Graphics Rendering Techniques
CS4249 Phenomena and Theories of Human-Computer Interaction <new>
CS4347 Sound and Music Computing <new>
EE4212 Computer Vision
EE4213 Image & Video Processing <not offered in AY15>
EE4604 Biological Perception in Digital Media <new>
ME4245 Robot Kinematics, Dynamics and Control
CEG Concentrations

**System-on-a-Chip Design**
- EE3407 Analog Electronics
- EE3408C Integrated Analog Design
- CS4223 Multi-Core Architectures
- EE4214 Real-time Embedded Systems
- EE4218 Embedded Hardware Systems Design
- EE4410A Integrated Circuit Design <no longer offered>
- EE4415 Integrated Digital Design
- EE4505 Power Semiconductor Devices & ICs

CEG Concentrations and Technical Elective Modules

- What does streaming involve?
- What are the compulsory requirements?
- How are technical electives organised?
- **CEG technical electives requirements**
- Recommended study schedules
CEG Technical Electives requirements

(a) Depth (D) requirement

At least TWO technical Depth electives

(b) Modular credits requirement

At least 12 MCs (from Technical Elective modules)

Modules may come from any of the concentrations!

ECE2 Streaming Talk & Career Fair tomorrow - 27 Mar (Fri)
12 - 5pm @ Engineering Auditorium and EA foyer
CEG2 may join from 1.15pm.

CEG Concentrations and Technical Elective Modules

- What does streaming involve?
- What are the compulsory requirements?
- How are technical electives organised?
- CEG technical electives requirements
- Recommended study schedules
## Recommended Study Schedules

- UEM, ULR (SS, GEM, ULR Breadth) requirements are indicated in random semesters. Remember to read these modules. Refer to the respective document at [http://www.ceg.nus.edu.sg/students/studyschedule.html](http://www.ceg.nus.edu.sg/students/studyschedule.html).
- Workload: Minimum of 15 MCs and up to 25 MCs per semester
- Compulsory Modules (Faculty requirements): EG2401 and HR2002
- CG3002 & EE3031 Project Modules:
  - Be careful about taking CG3002/EE3031 together with CG4001 FYP in semester 7 (e.g. due to SEP/IA).
    - Workload is very heavy!
    - Should try to find suitable mapping modules for either EE3031 (relatively easier) or CG3002 while on SEP.
  - If you plan to go for IA in semester 6, you may apply to read EE3031 and one other module (UEM/ULR/TE) in the evenings, subject to availability and approval.
- Pay attention to workload balancing!

## Recommended Schedule for CEG AY2014/15 (Poly) Intake

### Exempted from CG1108

**IMPORTANT:**
- Students are encouraged to take at least one business/management module to satisfy ULM/UEM.
- The minimum 12 MCs of electives satisfying CEG Breadth/Depth requirements can be taken in any semester upon satisfying the prerequisites.
- The ULR (GEMs, SS, ULR Breadths) and UEM can be taken in any semester.
- * If not taking SIP/VIP, need to take TE in lieu (in the regular semesters).

<table>
<thead>
<tr>
<th>Sem 2</th>
<th>Sem 3</th>
<th>Sem 4</th>
<th>May - July</th>
<th>Sem 5</th>
<th>Sem 6</th>
<th>Sem 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS2231 Discrete Structures</td>
<td>CS2103 Software Engineering</td>
<td>CG2271 Real-Time Operating Systems</td>
<td>EG2401 Engrg Profil</td>
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</tr>
<tr>
<td>EE2024 Programming for Computer Interfaces</td>
<td>MA1506 Math II</td>
<td>EG2041 Engg Profil</td>
<td>CG207 Computer Architecture</td>
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<tr>
<td>MA1505 Math I</td>
<td>PC1432 Physics IE</td>
<td>ST2334 Probability &amp; Statistics</td>
<td>EE3031 Innovation &amp; Enterprise I</td>
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<tr>
<td>PC1222 Fundamentals of Physics II</td>
<td>EE3204 Computer Commun Networks I</td>
<td>SS</td>
<td>Depth Elective</td>
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</tbody>
</table>

| 21 MCs | 20 MCs | 19 MCs | 6 MCs | 18 MCs | 14/15 MCs | 14 MCs |

**EG2401 Virtual Student Programme (optional):**

**EE2024 Student Internship Programme (optional):**

**MA2200 Student Internship Programme (optional):**
**Recommended Schedule for CEG AY2014/15 (Poly) Intake**  
(Not exempted from CG1108)

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Enjoy the rest of your B.Eng. programme!

... the best is yet to come!

Questions??