GNSS Courses by CSSTEAP - An Update

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GNSS Courses by CSSTEAP - An Update

Background

• GNSS has a major influence on the development of nations
• Ease of civilian life, precision in scientific applications, new dimensions in research, modernizations in industries
• Boosting the economy up
• Essential to build capacity in use of GNSS related technologies
• Ensure a prepared workforce for the growing opportunities in this sector
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Background

- UN-OOSA identified India as host country for establishing CSSTEAP and the Centre was established in November, 1995
- Hosted by Government of India with Department of Space as nodal agency.
- CSSTEAP resolution made it responsible for capacity building
- Commitment is embodied in the Indian sloka, “ज्ञानं दानात वृध्यते”
- Made substantial progress in furthering knowledge and experience of space applications in the region
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GNSS Course

• Classes on Navigation since beginning of this century
• Started full term course from 2015: 9-month duration
• Conducted by Space Applications Centre, ISRO, Ahmedabad

<table>
<thead>
<tr>
<th>Course</th>
<th>Year</th>
<th>Participants</th>
<th>Countries</th>
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<tbody>
<tr>
<td>GNSS-01</td>
<td>2015-2016</td>
<td>09</td>
<td>04</td>
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<tr>
<td>GNSS-02</td>
<td>2017-2018</td>
<td>12</td>
<td>05</td>
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<td>GNSS-03</td>
<td>2019-2020</td>
<td>15</td>
<td>08</td>
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Objectives

• Two fold objectives

  - Technical: Understand and utilize the benefits of GNSS technologies and spread their applications for the benefit of the nations

  - Cooperative level: Exchange information and knowledge and facilitate collaboration amongst participants
1. Designing the course:

**Academic Content**
- Course structure considering state of the art technology and effective societal usage
- Boost the usage capacity and applications

**Implementation Approach**
- Creating Cohesiveness

Recurrent adaptive method
Amendments

• Changes driven by past experience and feedback
• Three major elements factored the changes incorporated

ICG observations / recommendations
Feedback from previous course
Recent Technological developments
1. Designing the course: Syllabus

- Curriculum based on guidelines provided by the UN
- BoS suggest modifications, within the frame work of initial recommendation

<table>
<thead>
<tr>
<th>Paper/Module Name</th>
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<tbody>
<tr>
<td>Foundation Course</td>
<td>Advanced GNSS Receivers and Augmentation systems</td>
</tr>
<tr>
<td>Fundamentals of NAVCOM</td>
<td>GNSS/INS Integrated Navigation</td>
</tr>
<tr>
<td>GNSS Signals and Systems</td>
<td>GNSS Applications</td>
</tr>
<tr>
<td>GNSS Receivers</td>
<td>Space Weather and GNSS</td>
</tr>
<tr>
<td>Position Determination Techniques</td>
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Syllabus: *Changes introduced*

- Extensive foundation course
- SATCOM and DSP basics enhanced
- Topics on advanced receivers introduced
- New and novel applications introduced
- Increased interactive session
- Increased practical laboratory sessions for some modules
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Apportionment

Subject Apportionment

- Physics / Concept: 37%
- Mathematics: 27%
- Engineering: 31%
- Management: 05%

Total: 100%
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Syllabus: Special Focus on Space Weather

Space weather is critical to GNSS
Causes considerable perturbation to the equatorial ionosphere
Further we are very dependent on space-based technology

- Introduce
- Aware
- Technical knowledge dissemination
- Programs and projects
2. Implementation:

• Theory and experiment goes vis-à-vis

• Group Seminar on common topic of importance

• Project problem relevant to student’s own organization

• Lecturers selected from most experienced resources of SAC and premier academic institutions across India

• Increased Academia & Industry participation
2. Implementation: What’s New?

- Separate library for CSSTEAP-GNSS students
- Online quiz from question bank and real-time assessment
- Student’s Day
- Participation in National conferences with sessions on GNSS
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2. Implementation: - *CSSTEAP Efforts*

- CSSTEAP Compilation of GNSS lectures
- Educational SW tools developed by CSSTEAP faculties
- GNSS Simulator procured by CSSTEAP
- GNSS books by CSSTEAP faculties
3. Feedback : Positives

- Participants’ feedback is analysed
- Overall response: Course content is good and useful to their work
- Experienced faculties, effective Tutorial sessions were appreciated
- Students day, in-house library are very much beneficial
3. Feedback: Negatives

- Few participants felt course syllabus theoretically intensive: *Alterations made in the course*

- Definite mechanism for feedback after the course ends is absent

- Hinders sustainability of the cooperation process
4. Analysis: Shortcoming

• Lack of internetworking platform for participants
• Cohesion created amongst the participating candidates/ countries, remains unutilized

Suggested Actions

▪ CSSTEAP-GNSS participants meeting during each course
▪ Deliberating on support for data and information sharing
▪ Deliberating on keeping one full week of the course tailored on the basis of student’s requirement at their work.
Encouraging news

• Trained Individual became key persons for selection of GNSS receivers

• Participant introduced use of GNSS in floating dry docks

• Surveyors mentioned the ease of handling RTK and static survey receivers on understanding the theory

• Even meteorologists showed interest in using GNSS for meteorological uses
5. Further Endeavors

• Short Courses

• Endeavour for partnering with more organizations involved in GNSS for knowledge information sharing
Finally...

• Building up capacity vis-à-vis technical advancements in the field of GNSS

• Improvement in the Quality of life

• Extended cooperation between nations

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• Finally, all we aim at is to make the world a better place to live in for the future generations
Thank You