Topic: Python programming in “Remote Sensing and GIS” module of the DAIICT MSc Agri-ICT course

Target Audience: Semester-II, M. Sc.(ICT in Agriculture and Rural Development), Dhirubhai Ambani Institute of Information and Communication Technology

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Introduction: In this component, the students are acquainted with the notions of algorithm and algorithm development. The Python language will be the workhorse that we use. Python is a general-purpose open-source computer programming language used by thousands of developers around the world, in areas as diverse as spatial modelling, internet scripting, user interfaces, product customization, and more. This component aims to guide the students in form of self-directed tutorials and online classes, to bring the student sufficient computer coding skills to realize computational solutions to thematic problems. For this, we will use a variety of theoretical and applied examples that will gradually increase in complexity.

Objectives: After successful completion of this component, students will be able to:

- Formulate programmatic solutions of thematic problems
- Use Python language to access both spatial and non-spatial data
- Apply computational techniques to model, analyze and visualize (spatial) data

Prerequisites: Python programming skills (including Numpy), GIS skills (including data handling in QGIS), basic computer handling skills, familiarity with windows command line and secondary school mathematics

Content: GDAL and OGR in Python
         Geospatial development in QGIS

Reference material:

1. The free ebook: Think Python: How to think like a computer scientist, A. Downey, Green Tea Press.
3. Python for Data Analysis, W. McKinney, O'Really.
### DETAILED TIME TABLE

<table>
<thead>
<tr>
<th>Week 1 (Feb 22, 2016)</th>
<th>Online Class on “Python, NumPy and Matplotlib”</th>
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</thead>
<tbody>
<tr>
<td>Week 2 (Feb 29, 2016)</td>
<td>Self-directed tutorials on “Using GDAL/OGR libraries to explore spatial data”</td>
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<tr>
<td>Week 3 (Mar 08, 2016)</td>
<td>Self-directed tutorials to perform NDVI calculation and filtering of vector data</td>
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<tr>
<td>Week 4 (Mar 14, 2016)</td>
<td>Online Class on “Performing Batch Processing in QGIS” and “Sequencing Geoprocessing Workflows using QGIS Modeler”</td>
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<tr>
<td>Week 5 (Mar 21, 2016)</td>
<td>Self-directed tutorials to build own Plugin in QGIS</td>
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- The course will consist of 2 online classes and 5 self-directed tutorials.
- In each of the online classes, the solutions of the previous tutorial will be discussed, followed by presentation of new concepts and a tutorial based on the same.
- All the tutorials have to be completed by the end of the same week.
- The online classes are conducted during 1400-1500 hours. Due to existing commitments of our studio facilities, it would be difficult to extend the timings beyond 1530 hours.