1. Course Title | Speech Communication  
2. Credit Structure | Lecture hours per week: 3  
| | Tutorial hours per week: 0  
| | Practical hours per week: 0  
| | Total Credits: 3-0-0  
3. Course Code | CT 540 (5-level course)  
5. Category | Group Core II for MTech Sem III  
6. Prerequisite courses | Introductory knowledge of Signals and Systems but **not** mandatory (Relevant basics will be discussed in the proposed course).  
7. Foundation for | Computer Science, Machine Intelligence, Artificial Intelligence, Signal Processing and Communications, etc w.r.t. potential of various speech technologies  
8. Abstract Content | Speech technology plays a key role in design of conversational interfaces which is announced as one of the 10 breakthroughs in MIT’s Technology Review 2016. Innovation in voice-based technologies has been derived by surge in use of smartphones across the world (more so in India and China). In addition, it can be time consuming and in fact, frustrating to interact with computers using keyboard whereas speech is so natural to produce and it carries multiple levels of information, such as, linguistic message, speaker’s identity, health condition, acoustic environment in which it is recorded, emotion, cognition, attitude, gender, language, etc.  
| | The major objective of this course is to understand the potential of various speech technologies, such as, speech, speaker and language recognition, voice conversion, text-to-speech (TTS) synthesis, audio search, query-by-humming (QBH). The course equips students with different fundamental problems in speech science such as speech production process, speech perception, time-domain and frequency-domain processing, homomorphic speech processing and most popular linear prediction (LP) of speech and finally different diverse speech communication applications such as speech analysis, speech coding, speech synthesis, speech recognition and speaker recognition are discussed.  

**Suggested Textbook(s)**  
Note: The course typically covers first six chapters and chapter 11.
The course evaluation consider 30% weightage for performance in course project which motivates and prepare students to build practical implementation skill to do a course.

Students will be asked to choose any one of the project topic and develop algorithms to implement the objectives of course project. This will help students to apply and appreciate the theoretical concepts discussed in the class to real practical problems of speech technology including recent deep learning and machine learning algorithms.

Instructor will make all possible attempt to arrange for 1 guest lecture by a speech scientist from Speech Technology Industry.

Note: In the recent past, course instructor has arranged such guest from Microsoft Research.

This course will be of great value for those students who would like to do their thesis or project work (e.g., BTP, masters, doctoral) in various key research problems in speech communication.

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<tr>
<th>Course Evaluation</th>
<th>Attendance = 10%</th>
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<tbody>
<tr>
<td></td>
<td>Mid Term = 20%</td>
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<td>Course Project = 30%</td>
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<td>Endsem = 40%</td>
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