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| <b>Subject Code</b>                                | FH6051                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Subject Title</b>                               | Computational Linguistics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Credit Value</b>                                | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Level</b>                                       | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Pre-requisite / Co-requisite/<br/>Exclusion</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Objectives</b>                                  | <p>This subject aims to achieve the following goals:</p> <ul style="list-style-type: none"> <li>• To introduce students to the field of computational linguistics and its history.</li> <li>• To help students understand how linguistic structures can be automatically extracted and analyzed using computational methods.</li> <li>• To introduce students the various applications of computational linguistics and the basic technologies for such applications.</li> <li>• To provide students with the knowledge of related tools for text analysis and hands-on experience of using such tools.</li> <li>• To train students with basic programming skills for computational linguistics applications.</li> </ul>                                                                                                                                                                          |
| <b>Intended Learning Outcomes</b>                  | <p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> <li>(a) Understand and appreciate the development of the field of computational linguistics and its significance in modern applications;</li> <li>(b) Understand the complicated nature of human language and the challenges facing computational linguists;</li> <li>(c) Understand the scientific principles behind the various systems using natural language processing techniques;</li> <li>(d) Understand the principles of language resource annotation and information extraction;</li> <li>(e) Apply the above principles in analysis of data and acquire intended information through the use of tools;</li> <li>(f) Design simple programs for data extraction in different applications.</li> <li>(g) Problem solving using systematic ways and learning independently.</li> </ol> |
| <b>Subject Synopsis/<br/>Indicative</b>            | <ul style="list-style-type: none"> <li>• Introduction and overview</li> <li>• Regular expressions and state transition diagrams</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |



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| <b>Effort Required</b>             | ▪ Lecture                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 26 Hrs. |
|                                    | ▪ Tutorial/Lab                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 13 Hrs. |
|                                    | Other student study effort:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |         |
|                                    | ▪ Study lecture/text book materials for understanding of concepts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 35 Hrs. |
|                                    | ▪ Homework and Programming Assignments, online QA, and preparation for quizzes and tests                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 40Hrs.  |
|                                    | Total student study effort                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 114Hrs. |
| <b>Reading List and References</b> | <p><b>Text Book:</b><br/> Dan Jurafsky and James H. Martin, Speech and Language processing, 2<sup>nd</sup> Addition, Prentice Hall, 2008</p> <p><b>References:</b><br/> Christopher Manning and Hinrich Schuetze, Foundations of Statistical Natural Language Processing,<br/> Ruslan Mitkov, The Oxford Handbook of Computational Linguistics, Oxford University Press, 2005.<br/> Christopher Manning, Prabhakar Raghavan, and Hinrich Schuetze, Introduction to Information Retrieval, Cambridge University Press, 2008<br/> Steven Bird, ewan Klein, and Edward Loper, Natural Language Processing with Python, O'Reilly Media, 2009<br/> Hopcroft, J.E. and Ullman, J.D., Introduction to Automata, Theory and Languages, Addison-Wesley, 1979.</p> |         |