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| **Course Code** | CSU5305 |
| **Level** | 5 |
| **Course Title** | Theory of computing |
| **Credit value** | 3 credits |
| **Core/Optional** | Optional |
| **Prerequisites** | (EL/CR in 6 credits from L4 Computer Science courses)(CSU5304)+(CSU5305) (EL/CR ) and EL/CR in 6 credits from L4 Computer Science courses |
| **Hourly breakdown** | **Theory** | **Practical****hours** | **Independent Learning** | **Assessments** | **Total hrs.** |
| 25 Sessions X 2 = **50 hrs.** | 4DS x 3 hrs. = **12 hrs.** |  | * Sessions (25 x 3)

 = 75 hrs.* Online = 11hrs.

Total = **86hrs.** | * Continuous Assessments (CA) : **02 hrs.**
 | **150 hrs.** |
| **Course Aim/s.** | Analyze and compare the characteristics of different types of computational problem and of different models of computation. |
| **PLOs addressed by course**  | **PLO1: Knowledge:** Explain the fundamental, principles and broader knowledge pertaining to the chosen science disciplines offered for the degree.**PLO5: Creativity and Problem Solving:** Identify and analyze problems using quantitative and/or qualitative approaches using scientific methodology to provide valid conclusions. **PLO8**: **Vision for Life:** Develop the capacity to project for future through identifying self-directed goals and continuously targeting towards them for self-improvement by undertaking further studies. **PLO9: Lifelong Learning**: Develop the capacity to foresee new trends and their impacts and continuously update knowledge and develop skills willingly to meet those future challenges. |
| **Course Learning Outcomes (CLO)** | At the completion of this course student will be able to; CLO1: Design and implement solutions to a wide range of problems including constructing grammars or automations for given formal languages and specifying formal languages for given grammars or automations (PLO1,PLO5)CLO2: To write a technical report justifying a course of action from analyzing a scenario. (PLO1,PLO8,PLO9) |
| **Content****(Main topics ,sub topics)** | Introduction, Some Fundamental Concepts on alphabets and strings, Formal Languages, Finite Representation of Languages, Grammars, Context Free Grammars, The Chomsky hierarchy of grammars, Derivations, Derivation trees, Transition systems, Introduction to Computational models, Power of Machines, Finite State Machines, Computation with finite automation, Finite automaton as recognisors of languages, Accessibility and equivalence of Finite Automata, Non Deterministic Finite Machines, NFA with e –transitions, Transformation of NFA in to DFA, Partition and equivalence relations, Minimizing Finite State Machines, Finite State Transducers, Configuration and Moves of Finite State Transducers, Computations of Finite State Transducers, Operations on Finite State Sachines |
| **Teaching Learning methods (TL)** | Self-Learning/independent learning of self-study (IL)* Learning the course contents In course materials in print and web-based materials.
* Additional reading materials/ recommended reading (RE)

Contact sessions* Day schools (discussion sessions ) (Non- compulsory)
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| **Assessment strategy** | Overall Continuous Assessment Mark (OCAM): 40% | Final Assessment: 60 % |
| Details: Continuous Assessment I (CA I) : **01 hr.**  Continuous Assessment II (CA II) : **01 hr.** OCAM computation: OCAM= 60% of best CA I/CA II + 40% of other CA I /CA II | Final Evaluation Theory: **02 hrs.** |
| **Recommended** **Readings:** | 1. Peter Linz. (2011) *An Introduction to formal languages and Automata*, ,ISBN -13 9781449615529. Publisher Jhones and Bartlett Learning 4th edition
2. Kozen,D *.Theory of Computation*(2nd Ed).,Springer-Verlag London .ISBN-10:1-84628-297-7
3. Vivek Kultani. (2013). *Theory of Computation*(2nd Ed). OUP,India,
4. Michael-Sipser . (2012) . *Introduction to the Theory of Computation*(3rdEd), Cengage Learning,Boston, MA 022012,USA.(e-book)
5. Tourlakis ,G.J *.* (2012).*Theory of Computation* (2ndEd), Publisher: Reston Pub Co
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