SYLLABUS

B.TECH. (Computer Science & Engineering - Artificial Intelligence, Artificial Intelligence and Machine Learning, Bigdata Analytics, Internet of Things, Gaming Technology)

EIGHTH SEMESTER

Shri Shankaracharya Technical Campus, Bhilai

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SYLLABUS

B. Tech. Eight Semester- Computer Science & Engineering

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Sl. No.	Board of Studies (BOS)	Courses (Subject)	Course Code	Period per Week			Scheme of Examination Theory/Lab			Total Marks	Credit
				L	T	P	ESE	CT	TA		
1	Computer Science & Engineering	Computer Vision	**CS102801**	3	1	-	100	20	30	150	4
4	Computer Science & Engineering	Professional Elective IV	Refer table IV	2	1	-	100	20	30	150	3
5	Computer Science & Engineering	Open Elective III	Refer table III	3	-	-	100	20	30	150	3
6	Computer Science & Engineering	Computer Vision with Open CV Lab	CS102891	-	-	2	25	-	25	50	1
7	Computer Science & Engineering	Advanced R-Programming Lab	CS102892	-	-	2	25	-	25	50	1
8	Computer Science & Engineering	Capstone Project Phase II	CS102895	-	-	16	300	-	150	450	8
Total				**8**	**2**	**20**	**650**	**60**	**290**	**1000**	**20**

L : Lecture, T: Tutorial, P : Practical, ESE : End Semester Exam CT : Class test TA: Teacher's assessment

Table-I: Professional Elective – IV [8th Sem]

Sl. No.	Board of Studies (BOS)	Courses (Subject)	Course Code
1	Computer Science and Engg..	Parallel Processing and Computing	CS102821
2	Computer Science and Engg..	Generative AI	CS110822
3	Computer Science and Engg..	Introduction to Quantum Computing	CS110823
4	Computer Science and Engg..	Reinforcement Learning	CS110824

Table-II: Open Elective – III [8th Sem]

Sl. No.	Board of Studies (BOS)	Courses (Subject)	Course Code
1	Computer Science and Engg.	Cyber Law & Intellectual Property	CS100841

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Subject Code CS102801	Computer Vision with Open CV	L = 3	T = 0	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes
The objective of the course to: **1.** Understanding image formation, including camera models, pixel representation, and colour spaces. **2.** Exploring computer vision techniques such as feature extraction, object detection, and image segmentation. **3.** Open CV experience: provide practical exposure to Open CV tools for image **4.** Introduce students to pattern recognition concepts, including supervised and unsupervised learning approaches. **5.** Enable students to build real-world applications using computer vision techniques	**Students will be able to:** **CO1** Students will be proficient in basic image processing tasks, including filtering, edge detection, and image enhancement. **CO2** Understand and apply techniques for detecting objects in images and videos using Open CV. **CO3** Feature extraction competence: extract relevant features from images **CO4** Understanding gain insights into pattern recognition algorithms and their applications. **CO5** implement computer vision projects using Open CV.

UNIT 1 Introduction to Computer Vision and Image Processing: Basics of computer vision and image processing. various applications of computer vision across different industries. how to apply image processing and analysis techniques to computer vision problems. The unit will utilize Python, Pillow, and OpenCV for basic image processing and perform image classification and object detection.	**CO1** **7 Hrs.**
Unit – II: Image Filtering and Enhancement: Image filtering and enhancement techniques. how to use Open CV to apply filters to images, colour spaces, blurring, sharpening, and edge detection. enhance images using techniques histogram equalization, colour adjustment using curves.	**CO2** **8 Hrs.**
Unit – III: Geometric Transforms and Image Features:	**CO3** **7 Hrs.**

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Geometric Transforms-Affine Transform, Homography, Geometric Transforms in OpenCV, Image Features ORB, ORB Feature in Open CV, Feature Matching- Different, Feature Matching Algorithms in Open CV, RANSAC, Application: Image Alignment	
Unit – IV: Object Detection and Tracking: Object detection and tracking techniques. how to use Open CV to detect objects in images and track them over time. how to use deep learning techniques for object detection- Single Shot multi box detector (SSD) & You Only Look Once detector (YOLO), Face Detection-SSD based Face Detector.	**CO4** **7 Hrs.**
Unit – V: Image Segmentation and Recognition: Image segmentation and recognition techniques. image segmentation using Grabcut, Grabcut theory, Grabcut in Open CV, how to use Open CV to perform optical character recognition (OCR) on text in images. image classification- histogram of oriented gradients (HOG), support vector machine (SVM), eyeglass classifier in Open CV	**CO5** **7 Hrs.**

Text Books:

S. No.	Title	Author(s)	Publisher
1	Learning OpenCV: Computer Vision with the OpenCV Library	Gary Bradski	O'Reilly Media
2	Learning OpenCV 5 Computer Vision with Python, Fourth Edition	Joseph Howse, Joe Minichino	Packt Publications

Reference Books:

S. No.	Title	Author(s)	Publisher
1	Learn Computer Vision Using OpenCV with Deep Learning CNNs and RNNs	Sunila Gollapudi	Apress Publications

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CS102891	**Computer Vision Lab**	**L=0**	**T=0**	**P = 2**	**Credits = 1**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	25	**0**	**25**	**50**	**3 Hours**

Course Objectives	**Course Outcomes**
Course Objectives: • To be able to use python for image handling and processing. • To perform geometric transformation and computer homography matrix in python. • To be able to perform perspective transformation, edge detection, line detection and corner detection. • To be able to implement SIFT, SURF and HOG in python.	**Students will be able to: (after undergoing the course, students will be able to)** **CO1** Apply python for image handling and processing. **CO2** Apply python for geometric transformation and computer homography matrix. **CO3** Apply python for perspective transformation, edge detection, line detection and corner detection. **CO4** Apply python for SIFT, SURF and HOG.

List of Experiments

CO 12 Hrs.

Guidelines for Laboratory Conduction:

- Prior knowledge of Linear Algebra, Probability Theory, Machine Learning, Artificial Neural Network, Python programming language is essential.
- Operating System recommended: - 64-bit Open-source Linux or its derivative
- Recommended tools for the implementation: Python, Open CV, Tensor Flow, Pytorch, MATLAB, etc.
- Use of the Anaconda platform is encouraged.

Write programs to perform following activities:

1. Perform basic image handling and processing operations on the image.
2. Geometric transformation.
3. Compute homography matrix.
4. Perspective transformation.
5. Camera calibration.
6. Compute fundamental matrix.
7. Edge detection, line detection and corner detection.

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8.	SIFT feature descriptor.
9.	SURF and HOG feature descriptor.
10.	project based on computer vision application.

Text Books:

S. No.	Title	Author(s)	Publisher
1	Programming Computer Vision with Python	Jan Erik Solem	O'Reilly Media, ISBN: 978 1449316549
2	Practical Machines Learning for Computer Vision: End-to-End Machine Learning for Images	Valliappa Lakshmanan	O'Reilly Media, ISBN: 9391043836

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Subject Code CS102892	**Advance R- Programming Lab**	**L=0**	**T=0**	**P = 2**	**Credits = 1**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	25	**0**	**25**	**50**	**3 Hours**

Course Objectives	Course Outcomes
Course Objectives: 1. To develop an in-depth understanding of advanced R programming concepts such as functional programming, object-oriented programming, and debugging. 2. To learn how to write efficient and reusable code for data analysis and visualization. 3. To gain hands-on experience with machine learning algorithms and statistical modeling techniques. 4. To learn how to work with large datasets and perform data wrangling tasks using R. 5. To develop skills in web scraping, text mining, and data integration using R.	**Students will be able to:** **CO1** Students will be able to write efficient and reusable code for data analysis and visualization. **CO2** Students will be able to apply machine learning algorithms and statistical modeling techniques to real-world problems. **CO3** Students will be able to work with large datasets and perform data wrangling tasks using R. **CO4** Students will be able to develop skills in web scraping, text mining, and data integration using R. **CO5** Students will be able to design and implement custom R packages for data analysis and visualization.

List of Experiments

CO 12 Hrs.

1. **Data Cleaning:** Write a R program that cleans and preprocesses data by removing missing values, duplicates, and outliers.
2. **Data Visualization:** Create a R program that generates a variety of visualizations such as scatter plots, histograms, and heat maps.
3. **Machine Learning:** Develop a R program that uses machine learning algorithms to predict outcomes based on input data.
4. **Web Scraping:** Write a R program that extracts data from websites and stores it in a structured format.
5. **Text Mining:** Create a R program that analyzes text data to extract insights such as sentiment analysis, topic modeling, and text classification.
6. **Data Wrangling:** Develop a R program that transforms data from one format to another, such as

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converting CSV files to JSON.

7. **Statistical Analysis:** Write a R program that performs statistical analysis on data, such as hypothesis testing, regression analysis, and ANOVA.
8. **Data Modeling:** Create a R program that builds predictive models using data, such as linear regression, decision trees, and random forests.
9. **Data Integration:** Develop a R program that integrates data from multiple sources, such as databases, APIs, and spreadsheets.
10. **Data Mining:** Write a R program that discovers patterns and relationships in data, such as association rules, clustering, and anomaly detection.
11. **Data Exploration:** Create a R program that explores data using techniques such as data profiling, summary statistics, and data visualization.
12. **Data Validation:** Develop a R program that validates data to ensure it meets certain criteria, such as data type, range, and format.
13. **Data Transformation:** Write a R program that transforms data by applying functions such as scaling, normalization, and feature engineering.
14. **Data Aggregation:** Create a R program that aggregates data by grouping, summarizing, and filtering data.
15. **Data Storage:** Develop a R program that stores data in a database or file system, such as MySQL, Postgre SQL, or Hadoop.

Text Books:

S. No.	Title	Author(s)	Publisher
1	Advanced R	Hadley Wickham	CRC Press

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Subject Code CS102895	**Capstone Project Phase II**	**L=0**	**T=0**	**P = 4**	**Credits = 2**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	75	**0**	**25**	**100**	**3 Hours**

Guideline for Allocation of project: **CO 24 Hrs**

1. Information regarding broad area must be made available to the students well in advance (may be during previous semester).
2. Information must cover following parameters. I. Broad area: Subject or expertise/application area. II. Required skills: Knowledge of subject(s), software, tools & other characteristics. III. Type of project: Hardware, software, design, survey, study based etc. IV. Guide available: Name of Guide (S) from Department & Institute. V. Other related information depending upon specific branch & institute.
3. It is also recommended to give proper counseling to pick up suitable project.
4. Students must get chance to select projects as per their choice or decided mutually between students and department faculty (HoD) concern.
5. One project group must contain maximum four students; however, students can do project individually but it should be approved by department.
6. Compiled list of projects must be submitted to the University within 25 days of start of semester.
7. Compiled list may contain following parameters.

Monitoring of project:

1. It is recommended to give projects as per the specializations of existing faculty of the department instead of outside person/agency.
2. Project must be allocated, developed and monitored by department / institution itself, but not by outside agencies.
3. Regular review by guide is recommended to ensure development & contribution of students. Internal

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Evaluation & Submission of project:

1. Evaluation of project would be as per the examination scheme of the University, which is based on internal as well as external evaluation.
2. Internal assessment requires submission of project report for getting approved by the concern authority. However, printing and binding would be as per the conventional format.
3. Evaluation will be based on live demonstration / presentation and Viva.
4. Final submission of project is expected as, Submission of a copy to the University,• One copy to the Institution central library,• One copy to the department.•

External Evaluation:

External assessment of project would be like conduction of practical exams of university, and must be executed asper the norms of practical exams.

NOTE: Completion of Project outside the department/Institution should not be encouraged

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Professional Electives

Subject Code CS102821	**Parallel Processing and Computing**	**L = 3**	**T = 2**	**P = 0**	**Credits = 3**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	100	**20**	**30**	**150**	**3 Hours**

Course Objectives	**Course Outcomes**
The objective of the course to: **1.** Have an understanding of parallel algorithms, analysis and architectures. **2.** Be able to reason about ways to parallelize a problem **3.** Design and analyze the algorithms that execute efficiently on parallel computers	**Students will be able to:** **CO1** To develop structural intuition of how the hardware and the software work, starting from simple systems to complex shared resource architectures. **CO2** Get a broad understanding of parallel computer architecture and different models for parallel computing. **CO3** To understand concepts related to memory consistency models, cache coherence, interconnection networks, and latency tolerating techniques. **CO4** To know about current practical implementations of parallel architectures. **CO5** To learn how to design parallel programs and how to evaluate their execution

UNIT-I: Introduction & Technique of Parallelism: Trends towards parallel computing, parallelism in Uniprocessor systems, Architectural classification schemes, Amdahl's law, Moore's law, Principles of Scalable Performance, Parallel Processing in Memory, Parallel Algorithms, Parallel Algorithm Complexity, Models of Parallel Processing, Cache coherence, Cache coherence Protocols.	**CO 1** **8 Hrs**
UNIT-II: Pipeline & Vector Processing: Conditions of Parallelism: Data & Resource dependencies, Program flow mechanisms: Control-flow vs. Data flow computers Principle of pipelining and vector processing: principles of linear pipelining, classification of pipeline processors. General pipelines and reservation tables. Instruction and arithmetic pipelines, vector processing, architecture of Cray –1, Pipeline hazards, VLIW computers, Array Processing.	**CO 2** **7Hrs**

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UNIT-III: Parallel Programming Paradigms, Message Passing Interface (MPI), Basics of MPI, Parallel Sorting (bitonic sort, parallel merge sort) and Searching Algorithms, Parallel Matrix Operations, Matrix multiplication, Matrix inversion, Types of Data Routing Operations, Applications in scientific computing.	**CO 3** **7Hrs**
UNIT-IV: Multiprocessor architecture and Programming: Emulation and Scheduling, Emulations among Architectures, Distributed Shared Memory, Data Storage, Input, and Output, Multithreading and Latency Hiding, Parallel I/O Technology, Defect-Level Methods, Fault-Level Methods, Error-Level Methods, Parallel Programming Parallel Operating Systems, Parallel File Systems.	**CO 4** **7Hrs**
UNIT-V: Performance Optimization and Future Trends: Performance Analysis and Optimization Techniques, Profiling and benchmarking. Load balancing, Scalability considerations, Emerging Trends in Parallel Computing, Quantum parallelism, Neuromorphic computing, Cloud-based parallel computing, Case Studies and Project Work, Analyzing and optimizing real-world parallel applications, Implementing a parallel computing project	**CO5** **7Hrs**

Text Books:

S. No.	Title	Author(s)	Publisher
1	Computer Architecture & Parallel processing.	Kai Hwang 7 Briggs William Stallings	McGraw Hill Education (India) Private Limited; Third edition.
2	Parallel Computers: Arch.& Prog.	Rajaraman & Siva Ram Murthy	PHI.

Reference Books:

S. No.	Title	Author(s)	Publisher
1	Parallel Computer 2 –Arch.. & Algorithms	Adam Hilger, R.W. Hockney, C.R. Jesshope,	
2	Advanced Computer Architecture with Parallel Programming",	K. Hwang,	MGH

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3	Parallel computing- Theory and practice -	Michael J Quinn-	Mc Graw Hill

Subject Code CS110822	**Generative AI**	**L = 3**	**T = 1**	**P = 0**	**Credits = 3**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	100	**20**	**30**	**150**	**3 Hours**

Course Objectives	**Course Outcomes**

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The objective of the course to:	**Students will be able to:**
1. Overview of generative models and their applications. **2.** Overview of popular LLM architectures: RNNs, LSTMs, and Transformers. **3.** Overview of GPT variants and their use cases. **4.** Overview of various domains and industries benefiting from Generative AI.	**CO1** Understand the fundamentals of generative AI and its applications. **CO2** Explore practical implementation of generative models. **CO3** Develop critical thinking skills for evaluating generative AI outputs. **CO4** Learn effective teaching strategies for generative AI concepts. **CO5** Apply generative AI techniques to creative projects.

UNIT 1 Introduction to Generative AI Understand the fundamentals of generative AI and its applications. difference from other types of AI? (supervised and unsupervised learning), the technologies within generative AI, types of AI models, generative adversarial networks (GANs), variational autoencoders (VAEs), (GANs, VAEs, etc.), use cases: art, music, text generation, ethical considerations in generative AI.	**CO1** **7 Hrs.**
UNIT 2 Building Blocks of Generative Models and Language Models The role of NLP, deep Learning, and machine learning in generative AI, probability distributions, loss functions, training and evaluation, transformers & how transformers work? deep learning-based language models and their advantages, overview of popular LLM architectures: recurrent neural networks (RNNs), LSTMs, and transformer architecture, fine-tuning language models.	**CO2** **8 Hrs.**
UNIT 3 Generative AI Work and Programming how does generative AI work? training, preprocessing, model architecture, training the model, generating new content, programming with generative AI: - python libraries for generative AI (TensorFlow, PyTorch, etc.), critiquing AI-generated code: - quality assessment metrics, bias, fairness detection and mitigation, code readability and maintainability, peer code reviews.	**CO3** **7 Hrs.**
UNIT 4 Text, Image and Art Generation Image and video generation: - create visual art and images using generative techniques, music generation, natural language processing: text generation: - creative writing with AI, speech synthesis, generating digital art, style transfer. **Understanding GPT (Generative Pre-Trained Transformer):** - introduction to GPT and its significance, pre-training and fine-tuning processes in GPT, architecture and working of GPT models, overview of GPT variants and their use cases.	**CO4** **7 Hrs.**

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UNIT 5 Use Cases of Generative AI in Real-World Applications and Future Trends Overview of various domains and industries benefiting from generative AI applications: - healthcare, retail, banking and finance, media and entertainment, manufacturing, education, fashion, importance of generative AI in various domains, research challenges and future of generative AI, the dark side of generative AI: - pseudo-images and deep fakes.	**CO5** **7 Hrs.**

Text Books:

S. No.	Title	Author(s)	Publisher
1	Introduction to Generative AI: An Ethical, Societal, and Legal Overview	Maggie Engler and Numa Dhamani	Manning Publications
2	Generative AI with Python and TensorFlow 2	Joseph Babcock, Raghav Bali	Packt Publications

Reference Books:

S. No.	Title	Author(s)	Publisher
1	Generative Deep Learning 2nd Edition	David Foster	O'Reilly Media, Inc.

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Alternative NPTEL/SWAYAM Course (if any):

S. No.	NPTEL Course Name	Instructor, Host Institute	Link
1	Leveraging Generative AI for Teaching Programming Courses	IISc Bangalore	https://elearn.nptel.ac.in/shop/iit-workshops/completed/leveraging-generative-ai-for-teaching-programming-courses

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Subject Code CS110823	**Introduction to Quantum Computing**	**L = 3**	**T = 2**	**P = 0**	**Credits = 3**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	100	**20**	**30**	**150**	**3 Hours**

Course Objectives	**Course Outcomes**
The objective of the course to: **1.** A basic introduction to quantum mechanics, linear algebra and familiarity with the Dirac notation is provided first to get one's quantum moorings right . **2.** This is then followed by an introductory treatment of quantum computation and quantum information covering aspects of quantum entanglement, quantum algorithms, quantum channels. Rudimentary quantum computing is introduced using the IBM quantum computer and associated simulators.	**Students will be able to:** CO1: Learn Elementary Quantum Mechanics. CO2: Learn Quantum Correlation CO3: Understand Quantum Cryptography CO4: Understand Quantum Algorithms CO5: program a Quantum Computer.

UNIT 1 Introduction: Elementary quantum mechanics:, linear algebra for quantum mechanics, Quantum states in Hilbert space, The Bloch sphere, Density operators, generalized measurements, no-cloning theorem.	**CO 1 8Hrs**
UNIT 2 Quantum correlations: Bell inequalities and entanglement, Schmidt decomposition, superdense coding, teleportation.	**CO 2 7Hrs**
UNIT 3 Quantum cryptography: quantum key distribution.	**CO 3 7Hrs**
UNIT 4 Quantum gates and algorithms: Universal set of gates, quantum circuits, Solovay-Kitaev theorem, Deutsch-Jozsa algorithm, factoring	**CO4 7Hrs**
UNIT 5 Programming a quantum computer:The IBMQ, coding a quantum computer using a simulator to carry out basic quantum measurement and state analysis.	**CO 5 7Hrs**

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S. No.	Title	Author(s)	Publisher
1	An introduction to Quantum Computing,	Phillip Kaye, Raymond Laflamme et. al.,	Oxford University press, 2007.
2	Quantum Computing for Everyone,	Chris Bernhardt,	The MIT Press,Cambridge, 2020

Reference Books:

S. No.	Title	Author(s)	Publisher
1	Quantum Computing Explained	David McMahon	Wiley-Inter-science, IEEE Computer Society (2008)
2	Quantum Computation and Quantum Information,	M. A. Nielsen & I. Chuang,	Cambridge University Press (2013).
3	Quantum Computing, A Gentle Introduction,	Eleanor G. Rieffel and Wolfgang H. Polak	MIT press (2014)

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Subject Code CS110824	Reinforcement Learning	L = 3	T = 0	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes
The objective of the course to: **1.** Learn about Bellman equations and optimality and TD. **2.** Learn about transition dynamics and reward functions. **3.** Learn about hierarchical reinforcement learning. **4.** Build a Reinforcement Learning system for sequential decision making.	**Students will be able to:** **CO1** Understand the basics of reinforcement learning and MDPs. **CO2** Understand basic exploration methods. **CO3** Understand the multi-armed bandit problem and explore algorithms. **CO4** Understand linear function approximation. **CO5** Understand the space of RL algorithms

UNIT 1 Fundamentals of Reinforcement Learning, Introduction to reinforcement learning (RL) Markov decision processes (MDPs), Bellman equations and optimality, Dynamic programming and temporal difference (TD) methods.	**CO1** **7 Hrs.**
UNIT 2 Bandit Algorithms and Exploration, Multi-armed bandit problem, Upper Confidence Bound (UCB) algorithm, Probably Approximately Correct (PAC) bounds for bandits, Median Elimination algorithm, Policy Gradient methods for bandits.	**CO2** **8 Hrs.**
UNIT 3 Full Reinforcement Learning and Value Iteration, Transition dynamics and reward functions, Value iteration and policy iteration, Model-based vs. model-free RL, Exploration vs. exploitation trade-offs.	**CO3** **7 Hrs.**
UNIT 4 Function Approximation in Deep RL, Linear function approximation, Least Squares methods, Fitted Q-learning, Deep Q Networks (DQN).	**CO4** **7 Hrs.**
UNIT 5 Advanced Topics in RL, Hierarchical reinforcement learning, Partially Observable Markov Decision Processes (POMDPs), Eligibility traces, Policy Gradient methods for full RL	**CO5** **7 Hrs.**

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Text Books:

S. No.	Title	Author(s)	Publisher
1	Reinforcement Learning	Phil Winder	O'Reilly Media, Inc.
2	Reinforcement Learning an Introduction 2nd Edition	Richard S. Sutton & Andrew G. Barto	The MIT Press

Alternative NPTEL/SWAYAM Course (if any):

S. No.	NPTEL Course Name	Instructor, Host Institute	Link
1	Reinforcement Learning	Prof. Balaraman Ravindran, IIT Madras	https://onlinecourses.nptel.ac.in/noc19_cs55/preview

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Open Electives

Subject Code CS100841	Cyber Law & Intellectual Property	L = 3	T = 1	P = 0	Credits = 3
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	100	**20**	**30**	**150**	**3 Hours**

Course Objectives	Course Outcomes
The objective of the course to: **4.** To make attentive to students about different cybercrimes. **5.** To understand key terms and concepts in cybercrimes and cyber law. **6.** To make attentive to students about security privacy and challenges. **7.** To make attentive to students about copyright and patents.	**Students will be able to:** **CO6** Understand the cyber security threat landscape. **CO7** Understand cybercrimes and cyber laws. **CO8** Understand various privacy and security concerns on online social media its legal aspects and best practices. **CO9** Understand the important and application of IPR its regulations. **CO10** nderstand the application process of patent file and other related aspects such as search, registration and grant.

UNIT 1 Introduction to Cybercrimes Definition, cybercrime and information security, classes of cybercrime and categories, cyber offences, cybercrimes with mobile and wireless devices, cybercrime against women's and children, financial frauds, social engineering attacks.	**CO 1** **7 Hrs.**
UNIT 2 Cybercrime and Cyber Law Malware and ransom ware attacks, zero day and zero click attack, legal perspective of cybercrime, IT Act 2000 and its amendments, cybercrime and offence, organization dealing with cybercrime and cyber security in India, case studies.	**CO2** **8 Hrs.**
UNIT 3 Social Media Overview and Security Introduction to social network, types of social media, social media platforms, social media monitoring, hash tag, viral content, social media marketing, social media privacy & challenges, opportunities and pitfalls in online social network, security issues related to social media, flagging and reporting of inappropriate content, laws regarding posting of inappropriate content, best practices for the use of social media, case studies.	**CO3** **7 Hrs.**
UNIT 4 Introduction to Intellectual Property Rights (IPR) Introduction to IPR, international instruments and IPR, basic concepts and need for	**CO4** **7 Hrs.**

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intellectual property – patents, copyrights, trademarks, geographical indications, world intellectual property organization (WIPO), TRIPS, WTO, laws relating to IPR in India and Abroad, IPR tool kit, protection and regulation, copyright and neigh boring rights, agency for IPR registration, meaning and practical aspects of registration of patents, copyrights, trademarks, geographical indications, trade secrets and industrial design registration in India and Abroad, emerging area of IPR, use and misuse of intellectual property rights.	
UNIT 5 Patent's Introduction to patents, laws relating to patents in India, patent requirements, product patent and process patent, patent search, patent registration and granting of patent, exclusive rights and limitations, ownership and transfer, revocation of patent, patent appellate board, infringement of patent, compulsory licensing, patent cooperation treaty, new developments in patents, software protection and computer related innovations.	**CO5** **7 Hrs.**

Text Books:

S. No.	Title	Author(s)	Publisher
1	Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives	Sumit Belapure and Nina Godbole	Wiley India Pvt. Ltd. (First Edition 2011)
2	Cyber Laws: Intellectual Property & E-Commerce Security	Kumar K.	Dominant Publisher
3	Intellectual Property Rights (Patents & Cyber Law)	Dr. A. Srinivas	Oxford University Press, New Delhi

Reference Books:

S. No.	Title	Author(s)	Publisher
1	Cyber Law Text & Cases	Gerald R. Ferrera, Margo E.K. Reder	Cengage Learning Publication
2	Intellectual Property (Trade Marks and the Emerging Concepts of Cyber Property Right (HB))	P. Narayanan	Universal Book Traders (3rd Edition HB)

Shri Shankaracharya Technical Campus, Bhilai

(An Autonomous Institute Affiliated to CSVTU Bhilai)

SYLLABUS

B. Tech. Eight Semester- Computer Science & Engineering

(Artificial Intelligence, Artificial Intelligence and Machine Learning, Bigdata Analytics, Internet of Things, Gaming Technology)

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