



CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY

An Autonomous Institute | Affiliated to Osmania University
Kokapet Village, Gandipet Mandal, Hyderabad, Telangana-500075, www.cb.it.ac.in



COMMITTED TO
RESEARCH,
INNOVATION AND
EDUCATION

45
years

Department of Computer Science and Engineering

R20

PEOs of M.Tech (CSE) Program:

On completion of the program, M.Tech(CSE) graduates will be able to:

- Practice their profession with confidence and global competitiveness by making intellectual contributions.
- Pursue a life-long career of personal and professional growth with superior work ethics and character.
- Engage in research leading to innovations/products or becomes a successful entrepreneur.

POs of M.Tech (CSE) Program:

PO1: An ability to independently carry out research /investigation and development work to solve practical problems

PO2: An ability to write and present a substantial technical report/document

PO3: Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.

PO4: An ability to pursue higher studies or provide solutions for complex real world problems.

Head – Department of CSE

Professor and Head Department
Department of Computer Science & Engineering
Chaitanya Bharathi Institute of Technology (A)
Kokapet, Hyderabad-500 075


Department Vision


To be in the frontiers of Computer Science and Engineering with academic excellence and Research.

Department Mission

The mission of the Computer Science and Engineering Department is to:

1. Educate students with the best practices of Computer Science by integrating the latest research into the curriculum
2. Develop professionals with sound knowledge in theory and practice of Computer Science and Engineering
3. Facilitate the development of academia-industry collaboration and societal outreach programs
4. Prepare students for full and ethical participation in a diverse society and encourage lifelong learning


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Department of Computer Science and Engineering

A.Y: 2022-23
M.Tech CSE - R20 Course Outcome Statements

Semester-I

Sl. No	Code	Course Name	Course Outcome Statements
1	20CSC 101	Mathematical Foundation of Computer Science	<ol style="list-style-type: none"> 1. Solve the probability function by inequalities. 2. Infer the data by hypothesis testing procedure. 3. Apply graphs models in real time applications 4. Apply various counting techniques in solving combinatorial problems. 5. Design solutions using Recurrence Relations for real time problems. 6. Apply number theory to cryptography problems
2	20CSC 102	Advanced Data Structures	<ol style="list-style-type: none"> 1. Analyze the significance of Dictionaries and apply them to solve real-world problems. 2. Apply various hashing techniques to perform linear and quadratic probing. 3. Construct Skip Lists in a randomized and deterministic way. 4. Develop algorithms for various tree data structures like red-black trees, B-trees and Splay trees. 5. Apply the text processing operations for efficient space utilization. 6. Analyze computational geometric problems in terms of priority and range search operations.
3	20CSE101	Machine Learning (ELECTIVE-1)	<ol style="list-style-type: none"> 1. Identify complexity of Machine Learning algorithms and their limitations. 2. Recognize the underlying mathematical relationships within and across Machine Learning algorithms and their paradigms. 3. Design and implement machine learning solutions to classification, regression, and clustering problems. 4. Evaluate and interpret the results of the algorithms. 5. Develop an appreciation for what is involved in learning from data. 6. Apply graphical models for probabilistic reasoning.
4	20CSE102	Internet of Things (ELECTIVE-1)	<ol style="list-style-type: none"> 1. Understand an overview of IoT. 2. Use of devices and gateways in Service Oriented Architecture. 3. Analyze various communication protocols in sensor networks. 4. Design applications using Raspberry Pi and Node MCU. 5. Develop different IoT Automation Systems. 6. Apply IoT concepts in various domains such as Smart Cities, Home Automation, Weather Monitoring System, and Agriculture.

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5	20CSE103	Introduction to Intelligent Systems (ELECTIVE-1)	<ol style="list-style-type: none"> 1. Describe knowledge of the fundamental principles of intelligent systems. 2. Identify various search strategies to solve problems. 3. Compare and contrast knowledge representation schemes. 4. Appraise knowledge in Uncertainty and Probabilistic reasoning approaches. 5. Apply different learning techniques to solve complex problems. 6. Define the basic concepts of phases and applications of Natural Language processing.
6	20CSE113	Data Science & Big Data Analytics (ELECTIVE -II)	<ol style="list-style-type: none"> 1. Understand and explore big data Ecosystem using exploratory and statistical evaluation methods. 2. Analyze various machine learning algorithms and apply them to solve real-world problems. 3. Apply advanced analytical tools to perform logistic regression through experiments and extract meaningful data. 4. Apply data visualization techniques to evaluate models and to overcome data leakage problems. 5. Understand and apply Hadoop Ecosystem to explore bigdata analytics using Map-reduce techniques. 6. Analyze the significance of NoSQL database systems and apply them to perform bigdata analysis.
7	20CSE114	DISTRIBUTED DATABASE SYSTEMS (ELECTIVE -II)	<ol style="list-style-type: none"> 1. Differentiate key concepts and techniques for centralized, databases and distributed databases. 2. Analyze and design distributed database systems based on the principles of distributed indexing, query evaluation, data replication. 3. Implement storage, indexing, query evaluation and query optimization techniques 4. Implement the concepts of transaction management, concurrency, control, crash recovery, deadlocks and catalog management. 5. Apply suitable architecture for distributed databases and concepts of inter-operability of databases.
8	20CSE115	ADVANCED WIRELESS AND MOBILE NETWORKS (ELECTIVE -II)	<ol style="list-style-type: none"> 1. Identify the knowledge of wireless networking and its standards. 2. Recognize different cellular technologies (like 3G, 4G, 5G) and WLAN, WPAN, WWAN for performance analysis. 3. Demonstrate knowledge of protocols used in wireless networks and learn simulating wireless networks. 4. Analyze various wireless network transmission to build effective communication. 5. Relate Security techniques to resolve network vulnerabilities. 6. Develop mobile applications to solve some of the real-world problems.
9	20MEC 103	Research Methodology and IPR	<ol style="list-style-type: none"> 1. Define research problem, review and assess the quality of literature from various sources. 2. Improve the style and format of writing a report for technical paper/ Journal report, understand and develop various research designs. 3. Collect the data by various methods: observation, interview, questionnaires 4. Analyze problem by statistical techniques: ANOVA, F-test, Chi-square. 5. Understand apply for patent and copyrights.
10	20EGAI01	ENGLISH FOR RESEARCH PAPER WRITING (Audit Courses-1) (MTech Audit Course /II Sem- Common to all branches)	<ol style="list-style-type: none"> 1. Illustrate the nuances of research paper writing and draw conclusions about the benefits and limitations of research. 2. Classify different types of research papers and organize the format and citation of sources. 3. Review the literature and categorize between different types of research. 4. Draft paragraphs and write thesis statement in a scientific manner. 5. Develop an original research paper while acquiring the knowledge of how and where to publish their papers.


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11	20CEA101	DISASTER MITIGATION AND MANAGEMENT (Audit Courses-1) (M. Tech Audit Course I/II Sem - Common to all branches)	<ol style="list-style-type: none"> 1. Analyze and critically examine existing programs in disaster management regarding vulnerability, risk and capacity at 2. Understand and choose the appropriate activities and tools and set up priorities to build a coherent and adapted disaster man 3. Understand various mechanisms and consequences of human induced disasters for the participatory role of engineers in disa 4. Understand the impact on various elements affected by the disaster and to suggest and apply appropriate measures for the sa 5. Develop an awareness of the chronological phases of disaster preparedness, response and relief operations for formulating effective disaster management plans and ability to understand various participatory approaches/strategies and their application in disaster management
12	20BEA101	SANSKRIT FOR TECHNICAL KNOWLEDGE (Audit Courses-1) (MTech. Audit Course I/II Sem - Common to all	<ol style="list-style-type: none"> 1. Develop passion towards Sanskrit language. 2. Decipher the latent engineering principles from Sanskrit literature. 3. Correlates the technological concepts with the ancient Sanskrit history. 4. Develop knowledge for the technological progress. 5. Explore the avenue for research in engineering with aid of Sanskrit
13	20ECA101	VALUE EDUCATION (Audit Courses-1) (MTech Audit Course I/II Sem - Common to all branches)	<ol style="list-style-type: none"> 1. Gain necessary Knowledge for self-development. 2. Learn the importance of Human values and their application in day to day professional life. 3. Appreciate the need and importance of interpersonal skills for successful career and social life. 4. Emphasize the role of personal and social responsibility of an individual for all-round growth. 5. Develop a perspective based on spiritual outlook and respect women, other religious practices, equality, non-violence and universal brotherhood.
14	20EGA102	INDIAN CONSTITUTION & FUNDAMENTAL RIGHTS (Audit Courses-1) (MTech Audit Course I/II Sem - Common to all branches)	<ol style="list-style-type: none"> 1. Understand the making of the Indian Constitution and its features. 2. Understand the Rights of equality, the Right of freedom and the Right to constitutional remedies 3. Have an insight into various Organs of Governance - composition and functions. 4. Understand powers and functions of Municipalities, Panchayats and Co-operative Societies. 5. Understand Electoral Process, special provisions.
15	20EGA103	STRESS MANAGEMENT BY YOGA (Audit Courses-1) (MTech Audit Course I/II Sem - Common to all branches)	<ol style="list-style-type: none"> 1. To understand yoga and its benefits. 2. Enhance Physical strength and flexibility. 3. Learn to relax and focus. 4. Relieve physical and mental tension through asanas 5. Improve work performance and efficiency.

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16	20 EGA104	PERSONALITY DEVELOPMENT THROUGH LIFE'S ENLIGHTENMENT SKILLS (Audit Courses-1) (MTech. Audit Course I/II)	<ol style="list-style-type: none"> 1. Develop their personality and achieve their highest goal of life. 2. Lead the nation and mankind to peace and prosperity 3. To practice emotional self-regulation. 4. Develop a positive approach to work and duties. 5. Develop a versatile personality.
17	20CSC 103	ADVANCED DATA STRUCTURES LAB Laboratory 1	<ol style="list-style-type: none"> 1. Analyze and implement various data structures like stacks, queues and priority queues using arrays. 2. Analyze and implement various data structures like stacks, queues and priority queues using linked list 3. Implement Dictionary ADT using Linear and quadratic probing operations. 4. Construct a skip list data structure and perform various operations on it. 5. Analyze and implement various binary tree operations. 6. Analyze and implement the significance of various text processing operations for pattern matching.
18	20CSE107	Machine Learning Lab Laboratory 2 (Based on Elective-I,III)	<ol style="list-style-type: none"> 1. Apply mathematical foundations, algorithmic principles, and computer science theory to the modeling of computer-based problems. 2. Identify and utilize modern tools that are useful for data analysis 3. Recognize and implement various ways of selecting suitable model parameters for different machine learning techniques. 4. Implement unsupervised learning algorithms. 5. Implement and evaluate various Machine Learning approaches. 6. Design and develop solutions to real world problems using ML techniques.
19	20CSE108	Internet of Things Lab Laboratory 2 (Based on Elective-I,III)	<ol style="list-style-type: none"> 1. Understand internet of Things and its hardware and software components 2. Interface I/O devices, sensors & communication module. 3. Analyze the use of communication protocols in IoT. 4. Remotely monitor data and control devices. 5. Develop real time IoT based projects.
20	20CSE109	Introduction to Intelligent Systems Lab Laboratory 2 (Based on Elective-I,III)	<ol style="list-style-type: none"> 1. Write programs in Python/Prolog language. 2. Recognize the underlying mathematics and logic behind various computing algorithms under AI system. 3. Apply variety of uncertain algorithms to solve problems. 4. Describe and apply various techniques for logic programming and machine learning. 5. Implement problems using game search algorithms. 6. Develop solutions for real world problems using NLP.

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 Theoretical Department of Technology

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Semester-I		Course Name	Course Outcome Statements
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1	20CSC 104	Advanced Algorithms	<ol style="list-style-type: none"> 1. Define and discuss the different problems solved by using algorithmic paradigms. 2. Apply the matrix data structure for solving a problem using various strategies. 3. Differentiate the complexities of a problem solved in various approaches. 4. Evaluate various algorithmic design techniques. 5. Design appropriate mathematical notation to solve a problem using algorithmic paradigms. 6. Develop solutions for real world problem.
2	20CSC 105	Soft Computing	<ol style="list-style-type: none"> 1. Identify and describe soft computing techniques and their roles in building Intelligent Machines. 2. Comprehend appropriate learning rules for each of the neural network architectures and learn several neural network paradigms, its applications and limitations. 3. Apply fuzzy logic and reasoning to handle uncertainties and solve various engineering problems. 4. Apply genetic algorithms to combinatorial optimization problems. 5. Evaluate and compare solutions by various soft computing approaches for a given problem. 6. Recognize the underlying mathematics and logic behind various soft computing algorithms.
3	20CSE104	Data Preparation and Analysis (Elective -III)	<ol style="list-style-type: none"> 1. Identify and analyze various data gathering and preparation techniques to format, parse and transform data as required. 2. Apply exploratory data analysis techniques on various data set to perform consistency, check, transformation, and segmentation processes. 3. Analyze different visualization techniques and apply the suitable one to deal with real-world problem. 4. Apply correlations, connectivity, and interactivity techniques on different data items for any given dataset. 5. Analyze various statistical significance based testing mechanisms and apply them to build regression models.
4	20CSE104	Secure Software Design & Enterprise Computing (SSDEC) (Elective -III)	<ol style="list-style-type: none"> 1. Differentiate various software vulnerabilities and develop software to process vulnerabilities for an organization. 2. Evaluate various enterprise application design and development tools and standard practices. 3. Review techniques for successfully implementing and supporting network services on an enterprise scale and heterogeneous systems environment. 4. Know essential techniques for reducing and avoiding system and software security Problems. 5. Understand methodologies and tools to design and develop secure software containing minimum vulnerabilities and flaws. 6. Solve enterprise scale problems emanating from lapses in security requirements and information system management practices.
5	20CSE106	Computer Vision (Elective -III)	<ol style="list-style-type: none"> 1. Explain the basic principles of image processing and its significance in real world. 2. Intercept and evaluate various approaches for image transformation, segmentation, and restoration. 3. Choose object, scene recognition and categorization algorithms for real time images. 4. Analyze images and videos for problems such as tracking and structure from motion. 5. Explain various techniques to build computer vision applications. 6. Apply various techniques to build computer vision applications.
6	20CSE116	HUMAN AND COMPUTER INTERACTION (Elective-IV)	<ol style="list-style-type: none"> 1. Understand the structure of models and theories of human computer interaction. 2. Understand the vision of a computer user. 3. Understand the recognition and remembrance limitations of a computer user. 4. Understand the mobile ecosystem and use the corresponding tools for mobile design. 5. Design an interactive web interface on the basis of models studied.
7	20CSE117	GPU COMPUTING (Elective-IV)	<ol style="list-style-type: none"> 1. List out CPU/GPU configurations and identify the features of parallel programming. 2. Write simple programs using CUDA programming model. 3. Distinguish various memory hierarchies and carryout performance evaluation with different memories. 4. Illustrate synchronization concepts in CPU and GPU. 5. Point out advanced topics in multi-GPU processing and heterogeneous processing. 6. Develop programs using GPUs for real world problems in image processing, simulation and deep learning.


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8	20CSE118	DIGITAL FORENSICS Elective-IV	<ol style="list-style-type: none"> 1. Explain the fundamentals of digital forensics. 2. Choose the methods for collecting, preserving and recovering the evidence for use in investigations. 3. Explain the need to maintain the chain of evidence in criminal investigations and apply this in the context of simple case studies. 4. Analyze data acquired from various crime scene scenarios. 5. Describe the Legal Aspects of Digital Forensics. 6. Demonstrate the concept of Network Forensics and Mobile Forensics.
9	20ITA101	PEDAGOGY STUDIES (Audit Course-2)	<ol style="list-style-type: none"> 1. Illustrate the pedagogical practices followed by teachers in developing countries held in formal and informal classrooms. 2. Examine the effectiveness of pedagogical practices. 3. Understand the concept, characteristics and types of educational research and perspectives of research. 4. Describe the role of classroom practices, curriculum and barrier to learning. 5. Understand Research gaps and learn the future directions.
10	20CSC 106	ADVANCED ALGORITHM and SOFT COMPUTING LAB Laboratory 3 (AA& Soft Commedial)	<ol style="list-style-type: none"> 1. Describe and analyze various advanced Algorithms. 2. Implement various algorithmic design techniques. 3. Design and identify the suitable algorithmic paradigm to solve real world problems. 4. Design and analyze various Neural Networks Architectures. 5. Implement fuzzy sets and Genetic Algorithms with its operations. 6. Apply soft computing strategies for various real time applications.
11	20CSE110	Data Preparation and Analysis Lab Laboratory 4 (Based on Electives-III)	<ol style="list-style-type: none"> 1. Differentiate between numerical and categorical attributes and apply various pre-processing techniques to clean any chosen dataset. 2. Apply discretization and clustering techniques on preprocessed data. 3. Apply Association Rule mining technique to explore relationships among various attributes. 4. Apply exploratory data analysis techniques to develop meaningful data visualizations. 5. Apply various file-processing operations to deal with real-world datasets. 6. Create applications to deal with interactive datasets suitable to explore the significance of variables.
12	20CSE111	SECURE SOFTWARE DESIGN AND ENTERPRISE COMPUTING LAB Elective-III SSDE Lab (Based on Electives-III)	<ol style="list-style-type: none"> 1. Develop a security model for any enterprise based application on its threats and vulnerabilities. 2. Implement methodologies and tools to design secure software enterprise application. 3. Compare different types of threats and attacks. 4. Implement the various security algorithms to be implemented for secured computing and computer networks. 5. Evaluate various methods of authentication and access control for web based applications. 6. Analyze and apply different anti-intrusion techniques.
13	20CSE112	Computer Vision Lab (Based on Electives-III)	<ol style="list-style-type: none"> 1. Identify the fundamental issues and challenges of computer vision. 2. Apply image enhancement techniques. 3. Detect edges using various kernels and transformations. 4. Apply histogram processing and conversion between various colour spaces. 5. Analyze datasets using classification and clustering. 6. Evaluate computer vision system for real world problems.
14	20CSC 107	Mini Projects with seminar	<ol style="list-style-type: none"> 1. Demonstrate a sound technical knowledge of their selected project topic. 2. Undertake problem identification, formulation and solution. 3. Design engineering solutions to complex problems using a systems approach. 4. Analyze and interpret the results using appropriate modern tools. 5. Communicate with engineers and the community at large in written or oral forms. 6. Demonstrate the knowledge, skills and attitudes of a professional engineer.

Head, Dept. Of CSE, CBIT(A)

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Semester- III			
Sl. No	Code	Course Name	Course Outcome Statements
1	20CSE119	Mobile Applications and Services (Elective -V)	<ol style="list-style-type: none"> 1. Identify the target platform and users and be able to define and sketch a mobile application. 2. Design the User Interface for mobile applications. 3. Develop database management system to retrieve and/or store data for mobile application. 4. Analyze Android networking and Internet services use in Mobile Apps. 5. Illustrate the packaging and deploying mobile apps with performance best practices and location based services. 6. Evaluate the development process of mobile application with security concepts.
2	20CSE120	Compiler for HPC (Elective -V)	<ol style="list-style-type: none"> 1. Identify the basic concepts needed for the development of a compiler structure of a compiler 2. Explore the concepts of Parallel loops, data dependency, exception handling and debugging in a compiler. 3. Interpret and analyze the concepts involved in loop structuring and concurrency analysis. 4. Differentiate the various types of Machines, and the techniques like Vector Code from Sequential Loops for all Loops, Round off Error, Exceptions, and Debuggers, Multi. 5. Elaborate the Message passing Machines and Scalable Shared Machines 6. Determine the recent trends in compilers for efficient compiler building.
3	20CSE121	Open Source Technologies (Elective-V)	<ol style="list-style-type: none"> 1. Identify various OSS tools, platforms, licensing procedures, and development models, ethics 2. Describe various OSS projects, development models and project management 3. Adapt to the usage of OSS tools and technologies. 4. Distinguish between Proprietary and Open Source tools; development methods 5. Evaluate various Open Source projects like Linux, Apache, GIT 6. Practice Open Source principles, ethics, and models.
4	20CCSO 101	Business Analytics (Open ELECTIVE)	<ol style="list-style-type: none"> 1. Identify and describe complex business problems in terms of analytical models. 2. Apply appropriate analytical methods to find solutions to business problems that achieve stated objectives. 3. Interpret various metrics, measures used in business analytics 4. Illustrate various descriptive, predictive and prescriptive methods and techniques 5. Model the business data using various business-analytical methods and techniques. 6. Create viable solutions to decision making problems.

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5	20MEO 101	Industrial Safety (Open ELECTIVE)	<ol style="list-style-type: none"> 1. Identify the causes for industrial accidents and suggest preventive measures 2. Identify the basic tools and requirements of different maintenance procedures. 3. Apply different techniques to reduce and prevent Wear and corrosion in Industry. 4. Identify different types of faults present in various equipments like machine tools, IC Engines, boilers etc. 5. Apply periodic and preventive maintenance techniques as required for industrial equipments like motors, pumps and air compressors and machine tools etc.
6	20MEO102	Introduction to Optimization Techniques (Open Elective)	<ol style="list-style-type: none"> 1. Formulate a linear programming problems (LPP). 2. Build and solve Transportation Models and Assignment Models. 3. Apply project management techniques like CPM and PERT to plan and execute project successfully. 4. Apply queing and inventory concepts in industrial applications. 5. Apply sequencing models in industries.
7	20CEO101	Cost Management of Engineering Projects (Open Elective)	<ol style="list-style-type: none"> 1. Acquire in-depth knowledge about the concepts of project management and understand the principles of project management. 2. Determine the critical path of a typical project using CPM and PERT techniques. 3. Prepare a work break down plan and perform linear scheduling using various methods. 4. Solve problems of resource scheduling and leveling using network diagrams. 5. Learn the concepts of budgetary control and apply quantitative techniques for optimizing project cost.
8	20MEO103	Composite Materials (Open Elective)	<ol style="list-style-type: none"> 1. Classify and characterize the composite materials. 2. Describe types of reinforcements and their properties. 3. Understand different fabrication methods of metal matrix composites. 4. Understand different fabrication methods of polymer matrix composites. 5. Decide the failure of composite materials


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9	20EEO 101	Waste to Energy (Open Elective)	<ol style="list-style-type: none"> 1. Understand the concept of conservation of waste. 2. Identify the different forms of wastage. 3. Chose the best way for conservation to produce energy from waste. 4. Explore the ways and means of combustion of biomass. 5. Develop a healthy environment for the mankind.
10	20PYO101	History of Science and Technology (Open Elective)	<ol style="list-style-type: none"> 1. Demonstrate the process of beginning of science and civilization, knowledge acquisition and philosophical approach of science and its advancements in the Stone Ages and Antiquity period. 2. Illustrate the advancements in science and technology in the medieval period across Asia and Arab countries and decline and revival of science in Europe. 3. Explain the scientific approach and its advances of the Europeans and how the role of engineer during the industrial 20th century in finding ethical solutions to the societal problems. 4. Make use of the advancements in the field of science and technology by adopting new philosophies of 19th and first half of 20th century in finding ethical solutions to the societal problems. 5. Interpret the changes in specializations of science and the technology and build the relation between information and society from second half of 20th century onwards.

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Semester- IV

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1	20CCSC 109	DISSERTATION PHASE-II	<ol style="list-style-type: none"> 1. Use different experimentation techniques and technologies 2. Develop experimental set up/ Environment test rig 3. Conduct experiments by using the benchmark test rig 4. Analyze and interpret the results by using appropriate modern tools 5. Communicate effectively with technical reports and oral presentation 6. Make research contributions by publishing their work to the research community

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