



ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ

("ವಿ ಟಿ ಯು ಅಧಿನಿಯಮ 1994"ರ ಅಡಿಯಲ್ಲಿ ಕರ್ನಾಟಕ ಸರ್ಕಾರದಿಂದ ಸ್ಥಾಪಿತವಾದ ರಾಜ್ಯ ವಿಶ್ವವಿದ್ಯಾಲಯ)

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REGISTRAR

REF: VTU/BGM/BOS/PG Scheme 2022/2024-25/ 881

Date: 25 MAY 2024

CIRCULAR

Sir/Madam,

Subject: 21CBL66 - Missing Syllabus added and 21CB644 - Incomplete Syllabus updated regarding....

Reference: 1. Chairpersons email dated 23.05.2024
2. Hon'ble Vice-Chancellor's approval Dated : 25.05.2024

The syllabus of **21CBL66 - Artificial Intelligence and Machine Learning with Python Lab**, is missing, but the experiments to perform on this topic were already available in the **21CB62-integrated Professional Core Course (IPCC)**. As a result, the Board of Studies added a new course with the course code and title **21CBL66: Software Design with UML Laboratory** at this location. This circular includes a copy of the syllabus for stakeholders' information and reference.

A similar incomplete syllabus of course/subject **21CB644- Expert System and Decision Support System**, has been updated by the Board of Studies in CSE / ISE of VTU Belagavi and is attached to this circular.

All the principals are hereby informed to update the content of the circular to all concerned.

Sd/-

REGISTRAR

To,

1. The Principals of All Engineering Colleges under the ambit of the University
2. The Chairperson / program Coordinator, Department of CSE, University Departments at Kalaburgi, Belagavi, Muddenahalli, and Mysuru.

Copy

- The Hon'ble Vice- Chancellor through the secretary for information
- The Registrar (Evaluation) VTU Belagavi for information and needful
- The Director ITI SMU, VTU Belagavi for information and to upload the circular on VTU web Portal
- The Special officer, QPDS section VTU Belagavi to use the attached syllabus for the question paper setting and during scrutiny of the Question paper precisely.
- Special Officer, VTU Belagavi.

(Handwritten signature)
25/05/24

REGISTRAR

7

EXPERT SYSTEM AND DECISION SUPPORT SYSTEM

Course Code	21CB644	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03

Course Learning Objectives

- CLO 1. Introduce the concepts of Expert Systems
- CLO 2. Introduce the concepts of Decision Support Systems

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

1. Lecturer method (L) need not to be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes.
2. Use of Video/Animation to explain functioning of various concepts.
3. Encourage collaborative (Group Learning) Learning in the class.
4. Ask at least three HOT (Higher order Thinking) questions in the class, which promotes critical thinking.
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analyze information rather than simply recall it.
6. Introduce Topics in manifold representations.
7. Show the different ways to solve the same problem with different circuits/logic and encourage the students to come up with their own creative ways to solve them.
8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.

Module-1

What is Expert System? Nature of expertise, The Characteristics of expert systems, Fundamental topics in expert systems, acquiring knowledge, representing knowledge, controlling reasoning, Explaining solutions.

The representation of Knowledge: Principles and techniques, The STRIPS planner, Operator tables and means-ends analysis, Assessment of STRIPS representation and control, Sub-goaling in MYCIN, treating blood infections, MYCIN's knowledge base, MYCIN's control structure, Evaluating and comparing expert systems, Evaluation of MYCIN, Comparison with STRIPS.

Textbook 1: Chapter 1, 3

Teaching-Learning Process	Chalk and talk method / PowerPoint Presentation
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Module-2

Rule Based Systems: Canonical systems, Production system for problem solving, the syntax of rules, The working memory, Controlling behavior of interpreter, Conflict resolution, Forward and backward chaining, Rules and meta-rules.

Associative Nets and Frame systems: Graphs, trees, networks, the raise of associative networks, the type token distinction and cognitive economy, Assessing the adequacy of associative nets, representing typical objects and situations, Introduction to frame concepts, Complex nodes in a network, Defaults and demons, Multiple inheritance and ambiguity, Comparing nets and frames.

Textbook 1: Chapter 5, 6

Teaching-Learning Process	Chalk and talk method / PowerPoint Presentation
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Module-3

Management Support Systems: Managerial Decision-Making and Information Systems, Managers and Computer Support, Computerized Decision Support and the Supporting Technologies, A Framework for Decision Support, The Concept of Decision Support Systems, Group Support Systems, Enterprise Information Systems, Knowledge Management Systems, Expert Systems, Artificial Neural Networks, Advanced Intelligent Decision Support Systems, Hybrid Support Systems.

Decision-Making Systems, Modeling, and Support: Decision-Making-Introduction and Definitions, Systems, models.

Textbook-2: Chapter 1, Chapter 2 (2.1-2.4)	
Teaching-Learning Process	Chalk and talk method / PowerPoint Presentation
Module-4	
Decision-Making Systems, Modeling, and Support (Contd...): Phases of the decision-making process, Decision making-Intelligence phase, Decision making-design phase, Decision making-Choice phase, Decision making-Implementation phase.	
Decision support systems - Overview: DSS Configurations, What is a DSS?, Characteristics and Capabilities of DSS, Components of DSS, The Data Management Subsystem, The Model Management Subsystem, The User Interface (Dialog) Subsystem, The Knowledge-Based Management Subsystem, The User, DSS Hardware, DSS Classifications.	
Textbook-2: Chapter 2 (2.5-2.9), Chapter 3 (3.2-3.12)	
Teaching-Learning Process	Chalk and talk method / PowerPoint Presentation
Module-5	
Collaborative Computing Technologies - Group Support System: Group Decision-Making, Communication, and Collaboration Communication Support Collaboration Support: Computer-Supported Cooperative Work, Group Support Systems, Group Support Systems Technologies, Group Systems Meeting room and Online, The GSS Meeting Process, Distance Learning, Creativity and Idea.	
Textbook-2: Chapter 7	
Teaching-Learning Process	Chalk and talk method / PowerPoint Presentation
Course Outcomes	
At the end of the course the student will be able to:	
CO 1. Explain the role of expert systems in different domains.	
CO 2. Illustrate declarative rules, associative nets and Frame systems.	
CO 3. Explain frameworks of Management Support Systems.	
CO 4. Explain Decision-Making Systems and decision-support systems.	
CO 5. Compare Collaborative Computing Technologies for Group Support System.	

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination (SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour)**

1. First test at the end of 5th week of the semester
2. Second test at the end of the 10th week of the semester
3. Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

1. First assignment at the end of 4th week of the semester
2. Second assignment at the end of 9th week of the semester

Seminar with a brief write-up (report) on Case studies from the textbook-2 (not limited to) may be planned to attain the COs and POs for **20Marks (duration 01 hours)**

1. At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks** (to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper has to be designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours**)

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
3. The students have to answer 5 full questions, selecting one full question from each module
4. Marks scored shall be proportionally reduced to 50 marks

Suggested Learning Resources:

Textbooks

1. Peter Jackson, "Introduction to Expert systems", Pearson Education, 2001.
2. Efraim Turban and Jay E. Aronson, "Decision Support Systems and Intelligent Systems", Prentice Hall, Seventh Edition, 2005.

Reference Books:

1. Durkin J, "Expert Systems Design and Development", Prentice Hall, 1994.
2. Dan. W. Patterson, "Introduction to Artificial Intelligence and Expert systems", Prentice Hall, 2003

Weblinks and Video Lectures (e-Resources):

1. <https://www.youtube.com/watch?v=lyrFcgqFmlk>
2. <https://www.youtube.com/watch?v=wkizk7vTEF0>
3. <https://archive.nptel.ac.in/courses/106/106/106106140/>
4. <https://archive.nptel.ac.in/courses/110/105/110105147/>

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

Case studies/Case applications from the Textbook-2 (Chapter-1, 2, 3 and 7)

VI Semester

SOFTWARE DESIGN WITH UML LABORATORY			
CourseCode	21CBL66	CIEMarks	50
TeachingHours/Week(L:T:P:S)	0:0:2:0	SEEMarks	50
TotalHoursofPedagogy	24	TotalMarks	100
Credits	01	ExamHours	03
Course Learning Objectives:			
CLO1. Foundation knowledge in UML and UML diagrams.			
CLO2. Strong practice in UML tools through a variety of software design problems.			
Note:			
1. The sessions on basics of UML diagrams shall be organized before commencement of the lab.			
2. A suitable visual tool (Open source or other tools) shall be used to develop the UML diagrams.			
Sl.No.	Experiment Title		
1	Develop UML use-case diagrams that model ATM System and Stock Maintenance System.		
2	Develop UML class diagrams that model ATM System and Stock Maintenance System.		
3	Develop UML activity diagrams that model ATM System and Stock Maintenance System.		
4	Develop UML sequence diagrams that model ATM System and Stock Maintenance System.		
5	Develop UML object diagrams that model ATM System and Stock Maintenance System.		
6	Develop UML state-chart diagrams that model ATM System and Stock Maintenance System.		
7	Develop UML collaboration diagrams that model ATM System and Stock Maintenance System.		
8	Develop UML component diagrams that model ATM System and Stock Maintenance System.		
9	Develop UML deployment diagrams that model ATM System and Stock Maintenance System.		
Course Outcomes:			
At the end of the course the student will be able to:			
CO 1. Develop behavioral UML diagrams for different application design problems.			
CO 2. Build structural UML diagrams for different software design problems.			
CO 3. Make use of modern visual tools to develop UML diagrams.			
Assessment Details (both CIE and SEE)			
The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.			
Continuous Internal Evaluation (CIE):			
<ul style="list-style-type: none"> • CIE marks for the practical course are 50 Marks. • The split-up of CIE marks for record/ journal and test are in the ratio 60:40. • Each experiment is to be evaluated for conduction with an observation sheet and record write-up. Rubrics for the evaluation of the journal/write-up for hardware/software experiments are designed by the faculty who is handling the laboratory session and are made known to students at the beginning of the practical session. 			

- Record should contain all the specified experiments in the syllabus and each experiment write-up will be evaluated for 10 marks.
- Total marks scored by the students are scaled down to **30 marks** (60% of maximum marks).
- Weightage to be given for neatness and submission of record/write-up on time.
- Department shall conduct a test of 100 marks after the completion of all the experiments listed in the syllabus.
- In a test, test write-up, conduction of experiment, acceptable result, and procedural knowledge will carry a weightage of 60% and the rest 40% for viva-voce.
- The suitable rubrics can be designed to evaluate each student's performance and learning ability.
- The marks scored shall be scaled down to **20 marks** (40% of the maximum marks).
- The Sum of scaled-down marks scored in the report write-up/journal and marks of a test is the total CIE marks scored by the student.

Semester End Evaluation (SEE):

- SEE marks for the practical course are 50 Marks.
- **SEE shall be conducted by the two examiners. One from the same institute as an internal examiner and another from a different institute as an external examiner, appointed by the university.**
- The examination schedule and names of examiners are informed to the university before the conduction of the examination. These practical examinations are to be conducted between the schedule mentioned in the academic calendar of the University.
- All laboratory experiments are to be included for practical examination.
- (Rubrics) Breakup of marks and the instructions printed on the cover page of the answer script to be strictly adhered to by the examiners. **OR** based on the course requirement evaluation rubrics shall be decided jointly by examiners.
- Students can pick one question (experiment) from the questions lot prepared by the examiners jointly.
- Evaluation of test write-up/ conduction procedure and result/viva will be conducted jointly by examiners.

General rubrics suggested for SEE are mentioned here, writeup-20%, Conduction procedure and result in -60%, Viva-voce 20% of maximum marks. SEE for practical shall be evaluated for 100 marks and scored marks shall be scaled down to 50 marks (however, based on course type, rubrics shall be decided by the examiners)

Change of experiment is allowed only once and 15% of Marks allotted to the procedure part are to be made zero.

The minimum duration of SEE is 02 hours

Textbooks:

Grady Booch, James Rumbaugh and Ivar Jacobson, The Unified Modeling Language User Guide, 2nd Edition, Addison-Wesley Professional.

Suggested Weblinks/EResource

<https://www.geeksforgeeks.org/unified-modeling-language-uml-introduction/>

<https://www.tutorialspoint.com/uml/index.htm>

<https://www.javatpoint.com/uml>