Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

Course Contents (Syllabus) for

Second Year M. Tech.
(Computer Science and Engineering)
Sem – III to IV

AY 2020-21

Title of the Course: Dissertation Phases I & II (3CO690, 3CO691 and 3CO692)	L	T	P	Cr
	0	0	8+12	4+6

Pre-Requisite Courses:- Pre-dissertation work and seminar

Textbooks: -

References:

National and International conference papers in Computer Science and Engineering from IEEE, ACM, Springer, Elsevier etc. National and International journals in Computer Science and Engineering from IEEE, ACM, Springer, Elsevier etc.

Course Objectives :

1. Inspire students to tackle real world problems by applying knowledge in Computer Science and Engineering.
2. Impart flexibility to the student to have increased control over his/ her learning.
3. Enhance student's learning through increased interaction with peers and colleagues.

Course Learning Outcomes:

CO	After the completion of the course the student should be able to	Bloom's Cognitive level	Bloom's Cognitive Descriptor
CO1	**identify** the objectives of the dissertation by grasping and **analyzing** through an extensive literature review in the **significant** area of study.	3 4	Applying Analyzing
CO2	**analyze** the methodology and **appraise** the study through conduct of analytical/experimental work to achieve the objectives.	4 5	Analyzing Evaluating
CO3	**defend** the outcomes of the dissertation through **self-learning** and **compose** the project work as per appropriate standards of **documentation and presentation**.	5 6	Evaluating Creating

CO-PO Mapping :

PO	1	2	3	4	5	6
CO1	2	2	2	1		1
CO2	2	2		1		2
CO3		3	3	3	2	3

Assessments :

Teacher Assessment:

In Semester Evaluation (ISE) and End Semester Evaluation (ESE)

Assessment	Credits	Marks
Dissertation Phase I	4	100
Dissertation Phase II	2	100
Dissertation Phase II ESE	4	100

Dissertation phase I is based on the efforts by the student for synopsis preparation. It shall be evaluated using the parameters extent of literature review, scope defined, objectives, and fundamental concepts, quality of presentation, and interaction during presentation, effort/work done, quality of report and interaction with guide.

Dissertation phase II is based on the progress made during the semester for the objectives defined in the synopsis and the report submitted by the students. It shall be evaluated through progress seminar(s) at the end of the semester. The parameters for evaluation include extent of work done, results and discussion/publication efforts, quality of presentation, quality of report, interaction during presentation and interaction with guide.

ISE shall be conducted by Departmental Dissertation Evaluation Committee (DEC).

Dissertation Phase II shall be conducted at the end of semester III by a duly constituted examination panel composed of Chairman, internal examiner (guide) and external examiner.

ISE shall be conducted by Departmental Dissertation Evaluation Committee (DEC).

Dissertation Phase II ESE shall be conducted at the end of semester III by a duly constituted examination panel composed of Chairman, internal examiner (guide) and external examiner.

Course Contents:

The third semester dissertation work
is defined based on the interest of the students to specialize in a particular area.
Students are expected to carry out an independent research work on the chosen topic. In this semester it is expected that the student has carried out substantial research work including exhaustive literature survey, formulation of the research problem, development/fabrication of experimental set-up (if any/required) and testing, and analysis of initial results thus obtained.

ODD Semester

Professional Elective (Theory) Courses

Title of the Course: Professional Elective 5 - Recommender Systems (3CO611)	L	T	P	Cr
	3	0	0	3

Pre-Requisite Courses: Nil

Textbooks:

1. Coursera.org, course on "Introduction to Recommender Systems: Non-Personalized and Content-Based"

References:

1. Jannach D., Zanker M. and FelFering A., "Recommender Systems: An Introduction:, Cambridge University Press, First edition, 2011
2. Aggarwal Charu, "Recommender Systems: The Textbook", Springer, First edition, 2016
3. Ricci F., Rokach L., Shapira D., Kantor B.P., "Recommender Systems Handbook", Springer, First edition, 2011
4. Manouselis N., Drachsler H., Verbert K., Duval E., "Recommender Systems For Learning", Springer, First edition, 2013

Course Objectives :

1. To illustrate techniques for making recommendations, including non-personalized, content-based, and collaborative filtering
2. To appraise on automating choice-making strategies with goal of providing affordable, personal, and high-quality recommendations

Course Learning Outcomes:

CO	After completion of the course student should be able to	Bloom's Cognitive level	Bloom's Cognitive Descriptor
CO1	design recommendation system for a particular application domain.	3	Applying
CO2	assess recommender systems on the basis of metrics such as accuracy, rank accuracy, diversity, product coverage, and serendipity	5	Evaluating

CO-PO Mapping :

PO	1	2	3	4	5	6
CO1	2			3		
CO2	2			1	2	1

Assessments :

Teacher Assessment:

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weights respectively.

Assessment	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and ISE 2 are based on assignment/declared test/quiz/seminar etc.

MSE: Assessment is based on 50% of course content (Normally first three modules)

ESE: Assessment is based on 100% course content with60-70% weightage for course content (normally last three modules) covered after MSE.

Course Contents:

Module 1: Introduction	**Hrs.**
Preferences and Ratings, Predictions and recommendations, taxonomy of recommenders, Recommender system functions, Matrix operations, covariance matrices, Understanding ratings, Applications of recommendation systems, Issues with recommender system	**6**
Module 2: Content based filtering	**Hrs.**
Advantages and drawbacks of content based filtering, Item profiles, Discovering features of documents, pre-processing and feature extraction, obtaining item features from tags, TF-IDF, Case-Based Reasoning, Classification techniques	**7**
Module 3: Collaborative Filtering	**Hrs.**
User-User Collaborative Filtering, Influence Limiting and Attack Resistance, Trust-Based Recommendation, Impact of Bad Ratings, Item-Item Collaborative Filtering	**7**
Module 4: Hybrid Approaches	**Hrs.**
Opportunities for hybridization, Monolithic hybridization design: Feature combination, Feature augmentation, Parallelized hybridization design: Weighted, Switching, Mixed, Pipelined hybridization design: Cascade Meta-level, Limitations of hybridization strategies	**7**
Module 5: Evaluating Recommender System	**Hrs.**
Introduction, The goal of evaluation, Hidden data evaluation, prediction accuracy metrics, decision support metrics, rank-aware top-n metrics	**6**
Module 6: Types of Recommender Systems	**Hrs.**
Recommender systems in personalized web search, knowledge-based recommender system, Social tagging recommender systems, Trust-centric recommendations, Group recommender systems	**7**

Module wise Measurable Students Learning Outcomes :

Module 1: Understand functions, issues and applications of recommender systems

Module 2: Apply techniques of content-based filtering

Module 3: Apply techniques of collaborative filtering

Module 4: Apply hybrid filtering techniques

Module 5: Apply evaluation metrics on recommender systems

Module 6: Comprehend application of learned techniques in different types of recommender systems

Title of the Course: Professional Elective 5 - Human-Computer Interaction and Interface Design (3CO612)	L	T	P	Cr
	3	0	0	3

Pre-Requisite Courses: Nil

Textbooks:

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, "Human Computer Interaction", 3rd Edition Pearson Education
2. B. Shneiderman, Designing the User Interface, Addison Wesley 2000 (Indian Reprint)

References:

1. Preece J, Rogers Y, Sharp H, Baniyon D, Holland S and Carey T, "Human Computer Interaction", Addison-Wesley, 1994

Course Objectives :

1. To illustrate the concepts of Human Computer Interaction (HCI) with emphasis on its use with few case study example
2. To explain the challenges inherent in developing "HCI systems"
3. To explain core techniques in HCI design

Course Learning Outcomes:

CO	**After the completion of the course the student should be able to**	Bloom's Cognitive	
		level	Descriptor
CO1	illustrate concepts of HCI and UI.	2	Apply
CO2	analyze and design problem solving methods in HCI.	3	Analyzing
CO3	appraise applicability of HCI designs in solving engineering problems.	4	Evaluating
CO4	build and demonstrate typical HCI and UI system.	6	Creating

CO-PO Mapping :

PO	**1**	**2**	**3**	**4**	**5**	**6**
CO1	2		2	2		
CO2	1	1		1		
CO3	1		2	3	2	
CO4	1				2	3

Assessments :

Teacher Assessment:

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weights respectively.

Assessment	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and ISE 2 are based on assignment/declared test/quiz/seminar etc.

MSE: Assessment is based on 50% of course content (Normally first three modules)

ESE: Assessment is based on 100% course content with 70-80% weightage for course content (normally last three modules) covered after MSE.

Course Contents:

Module 1: Introduction	**Hrs.**
Course objective and overview, Historical evolution of the field, The Human, The Computer, The Interaction.	**7**
Module 2: Design processes	**Hrs.**
Interaction Design basics, Concept of usability – definition and elaboration, HCI in the Software Process, Design Rules.	**7**
Module 3: Implementation and Evaluation	**Hrs.**
Implementation Support, Evaluation Techniques, Universal Design, Use Support.	**6**
Module 4: Models	**Hrs.**
Cognitive Models, Socio – Organizational Issues and Stakeholders Requirements, Communication and Collaboration models.	**6**
Module 5: Theories	**Hrs.**
Task Analysis Dialog notations and Design Models of the system, Modeling Rich Interactions.	**7**
Module 6: Modern Systems	**Hrs.**
Group ware, Ubiquitous Computing and Augmented Realities Hypertext, Multimedia and World Wide web.	**7**

Module wise Measurable Students Learning Outcomes :

After the completion of the course the student should be able to

Module 1: illustrate concepts of HCI and approaches of HCI.

Module 2:

- analyse a given problem and identify the most suitable strategy for the problem and find solution.

- formulate a problem description as a design in HCI.

Module 3: understand evaluation techniques, understand universal design.

Module 4: differentiate Socio – Organizational Issues and differentiate Communication and Collaboration.

Module 5: analyse tasks with various design models and model rich interactions.

Module 6: build systems for Augmented Realities Hypertext, Multimedia and World Wide web.

Title of the Course: Professional Elective 5 - Computer Forensics (3CO613)	L	T	P	Cr
	3	0	0	3

Pre-Requisite Courses: Computer Networks

Textbooks:

1. John Sammons by Elsevier, "The Basics of Digital Forensics", Syngress, 2012

References:

1. Jha R. K., "Digital Forensic and Cyber Crime", Surendra Publications, 2016
2. Mohammed Sajid, "Digital Forensic And Cyber Crime", Bio Green Books, 2015
3. Bruce Nikkel, "Practical Forensic Imaging: : Securing Digital Evidence with Linux Tools", No Starch Press, 2016

Course Objectives :

1. To provide an in-depth study of the rapidly changing and fascinating field of computer forensics.
2. To inculcate in students the technical expertise and the knowledge required to investigate, detect and prevent digital crimes.
3. To provide students the knowledge of digital forensics legislations, digital crime, forensics processes and procedures, data acquisition and validation and e-discovery tools
4. To introduce e-evidence collection and preservation mechanism and ways of investigating operating systems and file systems, network forensics, art of steganography and mobile device forensics.

Course Learning Outcomes:

CO	**After the completion of the course the student should be able to**	Bloom's Cognitive	
		Level	Descriptor
CO1	understand fundamentals of Computer forensics and relevant legislations and codes of ethics	2	Understanding
CO2	analyze cyber-crime scenes and demonstrate the knowledge of collection of evidences.	3, 4	Applying, Analyzing
CO3	analyze the contents of various electronic storage devices using open source forensic tools	4	Analyzing

CO-PO Mapping :

PO	1	2	3	4	5	6
CO1					1	
CO2	2	2		1		2
CO3	3			2		

Assessment:

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weightage respectively.

Assessment	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and ISE 2 are based on assignment, oral, seminar, test (surprise/declared/quiz), and group discussion. [One assessment tool per ISE. The assessment tool used for ISE 1 shall not be used for ISE 2]

MSE: Assessment is based on 50% of course content (Normally first three modules)

ESE: Assessment is based on 100% course content with70-80% weightage for course content (normally last three modules) covered after MSE.

Course Contents:

Module 1: Digital Forensics Science	**Hrs.**
Forensics science, computer forensics, and digital forensics. **Computer Crime:** Criminalistics as it relates to the investigative process, analysis of cyber-criminalistics area, holistic approach to cyber-forensics	**7**
Module 2: Cyber Crime Scene Analysis	**Hrs.**
Discuss the various court orders etc., methods to search and seizure electronic evidence, retrieved and un-retrieved communications, Discuss the importance of understanding what court documents would be required for a criminal investigation.	**6**
Module 3: Evidence Management & Presentation	**Hrs.**
Create and manage shared folders using operating system, importance of the forensic mindset, define the workload of law enforcement, Explain what the normal case would look like, Define who should be notified of a crime, parts of gathering evidence, Define and apply probable cause.	**7**
Module 4: Computer Forensics & Network Forensics	**Hrs.**
Computer Forensics: Prepare a case, Begin an investigation, Understand computer forensics workstations and software, Conduct an investigation, Complete a case, Critique	**7**

a case, **Network Forensics:** open-source security tools for network forensic analysis, requirements for preservation of network data.	
Module 5: Mobile Forensics & Legal Aspects of Digital Forensics	**Hrs.**
Mobile Forensics: mobile forensics techniques, mobile forensics tools. **Legal Aspects of Digital Forensics:** IT Act 2000, amendment of IT Act 2008.	**7**
Module 6: Recent Trends	**Hrs.**
Recent trends in mobile forensic technique and methods to search and seizure electronic evidence	**6**

Module wise Measurable Students Learning Outcomes : Students will be able to

Module 1: understand and demonstrate the fundamentals of Digital forensics

Module 2: perform the analysis of cyber-crime scene and identify documents required

Module 3: managing the evidences collected and presenting appropriately

Module 4: perform investigation of computer and network using open source security tools.

Module 5: identify and use mobile forensics techniques and tools

Module 6: discuss the recent trends in different forensics techniques

ODD Semester

Professional Elective (Lab) Courses

ODD Semester

Open Electives Courses

ODD Semester

Mandatory Life Skill Courses

ODD Semester

Value Added
Professional Courses

EVEN Semester

EVEN Semester

Professional Core (Theory) Courses

EVEN Semester

Professional Core (Lab) Courses

Title of the Course: Dissertation Phases III & IV (3CO693, 3CO694 and 3CO695)	L	T	P	Cr
	0	0	8+24	4+12

Pre-Requisite Courses:- Dissertation Phase-II Completed

Textbooks: -

References:

National and International conference papers in Computer Science and Engineering from IEEE,

ACM, Springer, Elsevier etc.

National and International journals in Computer Science and Engineering from IEEE,

ACM, Springer, Elsevier etc.

Course Objectives :

4. Inspire students to tackle real world problems by applying knowledge in Computer Science and Engineering.
5. Impart flexibility to the student to have increased control over his/ her learning.
6. Enhance student's learning through increased interaction with peers and colleagues.

Course Learning Outcomes:

CO	After the completion of the course the student should be able to	Bloom's Cognitive level	Descriptor
CO1	To present dissertation work in an effective manner	2	understanding
CO2	To acquire paper-writing skills and publish research papers	2	applying
CO3	To evaluate the performance of the system and compare it with state-of-the-art	5	evaluating
CO4	To employ innovative practices to attain the objectives designed for dissertation work	6	creating

CO-PO Mapping :

PO	1	2	3	4	5	6
CO1		2			2	
CO2		3			3	
CO3				3		2
CO4	2		1			

Assessments :

Teacher Assessment:

In Semester Evaluation (ISE) and End Semester Evaluation (ESE)

Assessment	Credits	Marks
Dissertation Phase III	4	100
Dissertation Phase IV	4	100
Dissertation Phase IV ESE	8	100

Dissertation phase III is based on the work done by the student during fourth semester. It shall be evaluated using the parameters extent of work done after phase II, quality of presentation, interaction during presentation, and interaction with guide.

Dissertation phase IV is based on the work done during the semester and the report submitted by the students. It shall be evaluated through progress seminar(s) at the end of the semester. The parameters for evaluation include extent of work done, results and discussion/publication efforts, quality of presentation, quality of report, interaction during presentation and interaction with guide.

ISE shall be conducted by Departmental Dissertation Evaluation Committee (DEC).

Dissertation Phase IV ESE shall be conducted at the end of semester IV by a duly constituted examination panel composed of Chairman, internal examiner (guide) and external examiner.

Course Contents:

In fourth semester, the students continue their dissertation work. It is expected that the student has completed most of the experimental/computation works and analyzed the results so obtained as proposed in the synopsis. The work should be completed in all respects in this semester. The students are required to submit the dissertation work in the form of report as per the institute rule. They are also encouraged to submit and present their work in reputed conference/journal.

EVEN Semester

Professional Elective (Theory) Courses

EVEN Semester

Professional Elective (Lab) Courses

EVEN Semester

Open Electives Courses

EVEN Semester

Mandatory Life Skill Courses

EVEN Semester

Value Added
Professional Courses

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