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

3C0692) 0 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. Course Objectives : I. Inspire students to tackle real world problems by applying knowledge in Computer Science and Engineering. Biometric 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: CO1 identify the objectives of the dissertation by grasping and analyzing through an extensive literature review in the significant area of study. 4 Analyzing CO2 analytical/experimental work to achieve the objectives. 5 Evaluating C03 defend the outcomes of the dissertation through self-learning and self-learning and second of documentation and presentation. 5 Evaluating C03	Title of the Course: Dissertation Phases I & II (3CO690, 3CO691 a									L	Т	Р	Cr
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			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.

Professional Elective (Theory) Courses

Title o	f the Course: Professional Elec	tive 5	- Re	comn	nender	Syste	ms	L	Т	Р	Cr
(3 CO6	(3CO611)								0	0	3
Pre-Re	equisite Courses: Nil										
Textbo	ooks:										
	 Coursera.org, course on "Introduction to Recommender Systems: Non-Personalized and Content-Based" 										
Refere	nces:										
1. 2. 3.	 Jannach D., Zanker M. and FelFering A., "Recommender Systems: An Introduction:, Cambridge University Press, First edition, 2011 Aggarwal Charu, "Recommender Systems: The Textbook", Springer, First edition, 2016 Ricci F., Rokach L., Shapira D., Kantor B.P., "Recommender Systems Handbook", Springer, First 										
4.	Manouselis N., Drachsler H., Ver Springer, First edition, 2013	bert K	K., Du	val E.	, "Reco	ommer	nder Sys	stems F	for Lear	ming",	
Course	e Objectives :										
 To illustrate techniques for making recommendations, including non-personalized, content-based, and collaborative filtering To appraise on automating choice-making strategies with goal of providing affordable, personal, and high-quality recommendations 											
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CO	After completion of the course	stude	ent sh	ould	be able	e to	Bloc	bom's Cognitive			
<u>C01</u>	design recommondation gystem	for or	ortio	100 00	mliaati	0.19	leve		escripto)r	
COI	domain.	ioi a p	Jartici	iiai af	opiicati	011	5	A	pprying	,	
CO2	CO2 assess recommender systems on the basis of metrics such as accuracy, rank accuracy, diversity, product coverage, and serendipity 5 Evaluating										
CO-PO	CO-PO Mapping :										
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Assess	ments :		<u> </u>	<u> </u>			-				
Teache	er 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,	7
TF-IDF, Case-Based Reasoning, Classification techniques	
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								L	Т	Р	Cr
							Γ	3	0	0	3
Pre-Requisite Courses: Ni	1								1		
Textbooks:											
1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, "Human Computer Interaction", 3rd											
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2. D. Simerderman, Des	igning (ace, A	Juison	weste	2000 (1	nuian	Kepim	()	
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Computer Interaction	Addi "	son-W	eslev 1	994	11, Du		, 11011411	u D un		y 1, 11u	IIIuII
Course Objectives :	, 11441	5011 11	<i>corey</i> , 1	.,,,,							
1. To illustrate the cond	cepts of	Humar	n Comp	outer In	teracti	on (HC	I) with e	mphas	is on it	s use wi	th few
case study example	1		1			× ·	,	1			
2. To explain the challe	enges in	herent	in deve	loping	"HCI	systems	5"				
3. To explain core tech	niques i	n HCI	design			-					
Course Learning Outcome	s:										
CO After the completion	on of th	e cours	se the s	tuden	shou	ld be al	ole to	Blo	om's (Cognitiv	e
								lev	el l	Descript	or
CO1 illustrate concepts o	f HCI a	nd UI.						2	1	Apply	
CO2 analyze and design	problem	solvin	g meth	ods in	HCI.			3	1	Analyzir	ng
CO3 appraise applicabilit	y of HC	I desig	ns in s	olving	engine	ering p	roblems.	4]	Evaluati	ng
CO4 build and demonstra	te typic	al HCI	and U	I syster	n.			6	(Creating	
CO-PO Mapping :											
	РО	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 to	est/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 (r	normally					
last three modules) covered after MSE.		5					
Course Contents:							
Module 1: Introduction		Hrs.					
Course objective and overview, Historical evolution of the field, The Human, The Computer,							
The Interaction.							
Module 2: Design processes							
Interaction Design basics, Concept of usability – definition and elaboration, HCI in the							
Software Process, Design Rules.		/					
Module 3: Implementation and Evaluation		Hrs.					
Implementation Support, Evaluation Techniques, Un	niversal Design, Use Support.	6					
Module 4: Models		Hrs.					
Cognitive Models, Socio - Organizational Issues an	d Stakeholders Requirements,	6					
Communication and Collaboration models.		0					
Module 5: Theories		Hrs.					
Task Analysis Dialog notations and Design Models	of the system, Modeling Rich Interactions.	7					
Module 6: Modern Systems							
Group ware, Ubiquitous Computing and Augmented Realities Hypertext, Multimedia and							
World Wide web.							
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 o	f the Course: Professional Elective 5 - Computer Forensics	L	Т	Р	Cr				
(3CO6	513)	3	0	0	3				
Pre-R	Pre-Requisite Courses: Computer Networks								
Textbo	poks:								
1		201	-						
1.	1. John Sammons by Elsevier, "The Basics of Digital Forensics", Syngress, 2012								
Refere	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 Eviden	ce with	Linux	Tools",	No				
	Starch Press, 2016								
Cours	e Objectives :								
1	To provide on in death study of the regular changing and facting fir	ld of a		r forong	ing				
1. 2	To provide an in-depth study of the fapidity changing and fascinating fit	ired to	investi	nate det	ICS.				
۷.	and prevent digital crimes.		nivesti	gaic, uci					
3.	To provide students the knowledge of digital forensics legislations, digi	ital crin	ne, fore	ensics					
	processes and procedures, data acquisition and validation and e-discover	ery tools	5						
4.	To introduce e-evidence collection and preservation mechanism and wa	iys of ir	nvestig	ating					
	operating systems and file systems, network forensics, art of steganogra	aphy an	d mob	le devic	e				
	forensics.								
Cours	e Learning Outcomes:								
	5								
CO	After the completion of the course the student should be able to	Bl	oom's	Cognitiv	ve				
		Leve	el	Descrip	otor				
CO1	understand fundamentals of Computer forensics and relevant	2	U	nderstar	nding				
	legislations and codes of ethics				-				
CO2)2 analyze cyber-crime scenes and demonstrate the knowledge of 3, 4 Applying, Analyzing								
CO3	O3 analyze the contents of various electronic storage devices using open 4 Analyzing								
	source forensic tools								

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.					
	7				
Legal Aspects of Digital Forensics: IT Act 2000, amendment of IT Act 2008.					
Module 6: Recent Trends	Hrs.				
Recent trends in mobile forensic technique and methods to search and seizure					
	6				
electronic evidence					
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					

Professional Elective (Lab) Courses

Open Electives Courses

Mandatory Life Skill Courses

Value Added Professional Courses

Professional Core (Theory) Courses

Professional Core (Lab) Courses

										-	1	1
Title of the Course: Dissertation Phases III & IV (3CO693, 3CO694 and							L	Т	Р	Cr		
3CO695)								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	CO After the completion of the course the student should be able to						able to	Bloom's Cognitive				
								level	l Descriptor			
CO1	To present dissertation work in an effective manner									unde	erstanding	
CO2	To acquire paper-writing skills and publish research papers								2		applying	
CO3	To evaluate the performance of the system and compare it with5state-of-the-art5									ev	aluating	
CO4	To employ innovative	gned for	6		C	reating						
	dissertation work											
CO-PO Mapping :												
	I	PO	1	2	3	4	5	6				
		CO1	-	2		+	2	5				
		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.

Professional Elective (Theory) Courses

Professional Elective (Lab) Courses

Open Electives Courses

Mandatory Life Skill Courses

Value Added Professional Courses

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