SRM UNIVERSITY
FACULTY OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
COURSE PLAN

Course Code: CS0308
Course Title: Logic for Computer Science
Semester: VI
Course Time: Jan-May 2013

Day	A		B		C		D		E	
	Hour	Timing	Hour	Timing	Hour	Timing	Hour	Timing	Hour	Timing
Day 1	6	2.20PM-3.10PM	2	9.35AM-10.25AM	-		6	2.20PM-3.10PM	6	2.20PM-3.10PM
Day 2	1	8.45AM-9.35AM	5	1.30PM-2.20PM	7	3.10PM-4.00PM	5 7	1.30PM-2.20PM 3.10PM-4.00PM	1	8.45AM-9.35AM
Day 3	-	-	1 3	8.45AM-9.35AM 10.35-11.25AM	3 6	10.35-11.25AM 2.20PM-3.10PM	-	-	-	-
Day 4	4	11.25-12.15PM	-		2	9.35AM-10.25AM	4	11.25-12.15PM	4	11.25-12.15PM
Day 5	2	9.35AM-10.25AM	-		-		-		7	3.10PM-4.00PM

Location: S.R.M.E.C-Tech Park

Faculty Details:

Sec	Name	Office	Office Hour	Mail id
A	Mrs.K.Annapoorani Panayappan	Tech Park	Monday to Friday	annapoorani.k@ktr.srmuniv.ac.in
B	Mr.T.Senthil kumar	Tech Park	Monday to Friday	senthilkumar.t@ktr.srmuniv.ac.in
C	Ms.K.Varalakshmi	Tech Park	Monday to Friday	varalakshmi.k@ktr.srmuniv.ac.in
D	Ms.A.Jackulin mahariba	Tech Park	Monday to Friday	jackulin.a@ktr.srmuniv.ac.in
E	Mr.S.Pradeep	Tech Park	Monday to Friday	pradeep.s@ktr.srmuniv.ac.in

Required Text Books:

Huth M and Ryan M, "Logic in Computer Science : Modeling and Reasoning about systems", Cambridge University Press 2005

Web resources:

- http://www.cs.swan.ac.uk/~csetzer/logic-server/
- http://www.cis.upenn.edu/~jean/gbooks/logic.html
- http://arxiv.org/list/cs.LO/recent
- http://www.cs.rice.edu/~vardi/comp409

Prerequisite : MA 0101, MA0102, MA0211

Objectives

1. To provide main notions of Mathematical Logic
2. To learn Formal framework to construct logic arguments
3. To study deductive systems along with completeness

Assessment Details

Cycle Test – I	:	10 Marks
Surprise Test – I	:	5 Marks
Cycle Test – II	:	10 Marks
Model Exam	:	20 Marks
Attendance	:	5 Marks

Test Schedule

S.No.	DATE	TEST	TOPICS	DURATION
1	08/02/13	CYCLE TEST -1	I UNIT	1HR,50MIN
2	08/03/13	CYCLE TEST -2	II UNIT	1HR,50MIN
3	26/04/13	MODEL EXAM	III,IV,V UNITS	3 HOUR

Outcomes

Students who have successfully completed this course will have full understanding of the following concepts

Course outcome	Program outcome
To teach the main notations of mathematical logic To teach formal framework to construct logic arguments To teach deductive systems along with completeness	To understand propositional and predicate logic. To treat temporal logic and model checking. To check computation tree logic, binary decision diagrams etc.

Detailed Session Plan

PROPOSITIONAL LOGIC:

Declarative sentences - Natural deduction - Propositional logic as a Formal Language - Semantics of Propositional Logic - Normal Forms - SAT Solvers.

Session No.	Topics to be covered	Time (min)	Ref	Teaching Method	Testing Method
1	Declarative sentences	50	1	BB	Quiz
2,3	Natural deduction	50	1	BB	Objective type test Quiz
4	Propositional logic as a Formal	50	1	BB	Quiz
5,6	Semantics of Propositional Logic	50	1	BB	Quiz
7,8	Normal Forms	50	1	BB	Quiz, Assignment
9	SAT Solvers	50	1	BB	Quiz

PREDICATE LOGIC:

Predicate Logic as a formal Language - Proof Theory of Predicate Logic - Semantics of Predicate Logic –

Undecidability of Predicate Logic - Expressiveness of Predicate Logic Models- Micro models of Software

10,11	Predicate Logic as a formal Language	50	1	BB	Quiz
12,13, 14	Proof Theory of Predicate Logic	50	1	BB	Quiz
15	Semantics of Predicate Logic	50	1	BB	Quiz Surprise Test
16	Undecidability of Predicate Logic	50	1	BB	Quiz
17	Expressiveness of Predicate Logic	50	1	BB	Quiz
18	Micro models of Software	50	1	BB	Quiz, Assignment

VERIFICATION BY MODEL CHECKING

Motivation for Verification - Linear Time Temporal Logic - Model Checking : systems, Tools and Properties - Branching Time temporal Logic - Model Checking algorithms - CTL+ and the expressive power of LTL and CTL - Fixed point characterization of CTL

19	Motivation for Verification - Linear Time Temporal Logic	50	1	BB	Quiz
20	Model Checking : systems, Tools and Properties	50	1	BB	Quiz Group discussion
21	Branching Time temporal Logic	50	1	BB	Quiz,
22	Model Checking algorithms	50	1	BB	Quiz Surprise Test
23	Model Checking algorithms	50	1	BB	Quiz Group discussion
24	CTL* and the expressive power of LTL and CTL	50	1	BB	Quiz
25	CTL* and the expressive power of LTL and CTL	50	1	BB	Quiz
26	Fixed point characterization of CTL	50	1	BB	Quiz
27	Fixed point characterization of CTL	50	1	BB	Quiz

PROGRAM VERIFICATION AND MODAL LOGIC

A Framework for software verification - Proof calculus for partial correctness - Proof calculus for total correctness - Basic Modal logic - Logic Engineering - Natural Deduction - Reasoning about knowledge in a multi-agent system

28	A Framework for software verification	50	1	B B	Assignment
29	Proof calculus for partial correctness	50	1	B B	Quiz
30	Proof calculus for partial correctness	50	1	B B	Assignment
31	Proof calculus for total correctness	50	1	B B	Assignment
32	Basic Modal logic	50	1	B B	Objective type test
33	Logic Engineering	50	1	BB	Quiz
34	Natural Deduction	50	1	BB	Objective type test
35	Reasoning about knowledge in a multi-agent system	50	1	BB	Objective type test
36	Reasoning about knowledge in a multi-agent system	50	1	BB	Quiz
37	overview	50	1	BB	Objective type test

BINARY DECISION DIAGRAMS Representing Boolean functions - Algorithms for reduced OBDDs - Geometric Templates from Spatial Relations - Application - Image Based Rendering - Symbolic Model Checking - A relational Mu - calculus - Coding CTL models and specifications.					
38	Representing Boolean functions	50	1	BB	Group discussion
39,40	Algorithms for reduced OBDDs	50	1	BB	Objective type test
41	Geometric Templates from Spatial Relations - Application	50	1	BB	Quiz
42	Image Based Rendering	50	1	BB	Surprise test
43	Symbolic Model Checking	50	1	BB	Assignment
44	A relational Mu - calculus	50	1	BB	Quiz
45	Coding CTL models and specifications	50	1	BB	Quiz

- **BB – Black Board**

Prepared by

Mr T.SENTHIL KUMAR

Approved By

HOD/CSE