J.B. INSTITUTE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

Formal language and Automata Theory

Course File

		ACADEMIC YEAR	2013-14

D.HIMAGIRI,
Asst.Professor,
CSE Department, JBIET.

	COURSE PLAN	2013-14
		Regulation: R11

FACULTY DETAILS:

Name of the Faculty:: D. HIMAGIRI
Designation: Asst.Professor
Department:: CSE

COURSE DETAILS

Name Of The Programme::D.HIMAGIRI
Designation: :Asst.Professor
Year::II B.Tech
Department::CSE
Title of The Subject::Formal Language and Automata Theory
No of Students:113

Batch::2012-2016

Semester:: IInd Sem

Subject Code

	COURSE PLAN	2013-14
		Regulation: R11

FACULTY DETAILS:

Name of the Faculty:: D. HIMAGIRI
Designation: Asst.Professor
Department:: CSE

1. TARGET

a) Percentage Pass
100%

b) Percentage I class
100%

2. COURSE PLAN

(Please write how you intend to cover the contents: i.e., coverage of Units by lectures, guest lectures, design exercises, solving numerical problems, demonstration of models, model preparation, or by assignments, etc.)

3. METHOD OF EVALUATION

3.1. Continuous Assessment Examinations (CAE 1, CAE 2)

3.2. Assignments / Seminars

3.3. Mini Projects

3.4. Quiz

3.5. Term End Examination

4. List out any new topic(s) or any innovation you would like to introduce in teaching the subject in this Semester.

- 2 way finite Automata
- Application of the concepts of automata theory .

Signature of HOD
Date:

Signature of Faculty
Date:

	GUIDELINES TO STUDY THE SUBJECT	2013-14
		Regulation: R11

FACULTY DETAILS:

Name of the Faculty::D.HIMAGIRI

Designation:Asst.Professor

Department::CSE

Guidelines for Preparing the Course:

Course Description:
This module introduces the theory of computation through a set of abstract machines that serve as models for computation - finite automata, pushdown automata, and Turing machines - and examines the relationship between these automata and formal languages. Additional topics beyond the automata classes themselves include deterministic and nondeterministic machines, regular expressions, context free grammars, undecidability, and the P and NP problems.

Course Objectives:
1. Understand basic properties of formal languages and formal grammars. 2. Understand basic properties of deterministic and nondeterministic finite automata 3. Understand the relation between types of languages and types of finite automata 4. Understanding the Context free languages and grammers, and also Normalising CFG. 5. Understanding the minimization of deterministic and nondeterministic finite automata. 6. Understand basic properties of Turing machines and computing with Turing machines. 7. Understand the concept of Pushdown automata and its application. 8. Know the concepts of tractability and decidability, the concepts of NP-completeness and NP-hard problem. 9. Understand the challenges for Theoretical Computer Science and its contribution to other sciences.

Learning Outcomes:
1)Knowledge Acquire a full understanding and mentality of Automata Theory as the basis of all computer science languages design - Have a clear understanding of the Automata theory concepts such as RE's, DFA's, NFA's, Turing machines, Grammar, halting problem, computability and complexity. **2) Cognitive skills (thinking and analysis).** - Be able to design FAs, NFAs, Grammars, languages modelling, small compilers basics - Be able to design sample automata - Be able to minimize FA's and Grammars of Context Free Languages. **3)Professional Skill** - Perceive the power and limitation of a computer - Solve the problems using formal language **4) Attitude**- Develop a view on the importance of computational theory.

	COURSE OBJECTIVES	2013-14
		Regulation: R11

FACULTY DETAILS:

Name of the Faculty::D.HIMAGIRI
Designation:Asst.Professor
Department::CSE

On completion of this Subject / Course the student shall be able to:

S.No.	Objectives	Outcomes
1.	Understand basic properties of formal languages and formal grammars.	1,2
2.	Understand basic properties of deterministic and nondeterministic finite automata.	1,2,3
3.	Understand the relation between types of languages and types of finite automata.	1,2,3
4.	Understanding the Context free languages and grammars, and also Normalising CFG.	1,2,3
5.	Understanding the minimization of deterministic and nondeterministic finite automata.	1,2,3
6.	Understand basic properties of Turing machines and computing with Turing machines	1,4
7.	Understand the concept of Pushdown automata and its application.	1,4
8.	Understand the concepts of tractability and decidability, the concepts of NP-completeness and NP-hard problem.	1,4
9.	Understand the challenges for Theoretical Computer Science and its contribution to other sciences	4

Signature of Faculty
Date:

	COURSE OUTCOMES	2013-14
		Regulation: R11

FACULTY DETAILS:

Name of the Faculty::D.HIMAGIRI

Designation:Asst.Professor

Department::CSE

The expected outcomes of the Course / Subject are:

S.No.	General Categories of Outcomes	Specific Outcomes of the Course
A.	An ability to apply knowledge of mathematics, science, and engineering	Acquire a full understanding and mentality of Automata Theory as the basis of all computer science languages design.
B.	An ability to design and conduct experiments, as well as to analyze and interpret data	- Be able to design sample automata
C.	An ability to design a system, component, or process to meet desired needs within realistic Constraints such as economic, environmental, social, political, ethical, health and safety, Manufacturability and sustainability	no
D.	An ability to function on multi-disciplinary teams	no
E.	An ability to identify, formulate, and solve engineering problems	Be able to design FAs, NFAs, Grammars, languages modelling, small compilers basics.
F.	An understanding of professional and ethical responsibility	N o
G.	An ability to communicate effectively	no
H.	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	Yes
I.	A recognition of the need for, and an ability to engage in life-long learning	yes
J.	A knowledge of contemporary issues	no
K.	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	yes

Objectives – Outcome Relationship Matrix (Indicate the relationships by☒mark).

Outcomes / Objectives	A	B	C	D	E	F	G	H	I	J	K
1.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
2.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
3.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
4.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
5.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
6.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
7.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
8.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
9.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
10.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

	COURSE SCHEDULE	2013-14
		Regulation: R11

FACULTY DETAILS:

Name of the Faculty:: D.HIMAGIRI
Designation: Asst.Professor
Department:: CSE

The Schedule for the whole Course / Subject is::

S. No.	Description	Duration (Date)		Total No. of Periods
		From	To	
1.	Fundamentals of automata theory	9/12/2013	19/12/2013	7
2.	Automata:DFA and NFA	20/12/2013	9/1/2014	16
3.	Regular Languages and regular Expressions	21/1/2014	30/1/2014	8
4.	Grammar Formalism:LMD,RMD,Parse Trees	31/1/2014	7/2/2014	9
5.	Context Free Grammars	17/2/2014	26/2/2014	8
6.	Push Down Automata	27/2/2014	10/03/2014	10
7	Turing Machine	11/03/2014	21/03/2014	9
8	Computability Theory	23/03/2014	4/04/2014	8

Total No. of Instructional periods available for the course: 75Hours / Periods

	SCHEDULE OF INSTRUCTIONS UNIT - I	2013-14 Regulation: R11

FACULTY DETAILS:

Name of the Faculty:: D.HIMAGIRI
Designation: Asst.Professor
Department:: CSE
The Schedule for the whole Course / Subject is::

Sl. No.	Date	No. of Periods	Topics / Sub - Topics	Objectives & Outcome Nos.	References (Text Book, Journal…) Page No___ to ___
1	9/12/13	1	Strings, Alphabet, Language, Operations	2,3	TB:1,13
2	10/12/13	1	Finite state machine, definitions, finite automaton model	2,3	TB:1,32
3	11/12/13	1	acceptance of strings and languages	2,3	TB:1,36
4	13/12/13	1	deterministic finite automaton	2,3	TB:1,38
5	16/12/13	1	non deterministic finite automaton	2,3	TB:1,38
6	18/12/13	1	transition diagrams	2,3	TB:1,44
7	19/12/13	1	Language recognizers	2,3	TB:1,67

Signature of Faculty
Date

TB1:formal language and automata theory by sunitha and kalayani.

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
2. ADDITIONAL TOPICS COVERED, IF ANY, MAY ALSO BE SPECIFIED **BOLDLY**.
3. MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

	SCHEDULE OF INSTRUCTIONS UNIT - II	2013-14 Regulation: R11

FACULTY DETAILS:

Name of the Faculty:: D.HIMAGIRI
Designation: Asst.Professor
Department:: CSE

The Schedule for the whole Course / Subject is::

Sl. No.	Date	No. of Periods	Topics / Sub - Topics	Objectives & Outcome Nos.	References (Text Book, Journal…) Page No___ to ___
1	20/12/13	1	NFA with Î transitions - Significance	1,2, 3	TB:1,49
2	21/12/13	2	NFA with Î transitions - acceptance of languages	1,2, 3	TB:1,49
3	23/12/13	2	Conversions and Equivalence	1,2, 3	TB:1,44
4	26/12/13	1	Equivalence between NFA with and without Î transitions	1,2 3	TB:1,44
5	28/12/13	2	NFA to DFA conversion	1,2, 3	TB:1,45
6	30/12/13	2	Minimisation of FSM	1,2, 3	TB:1,54
7	2/1/14	2	Minimisation of FSM	1,2, 3	TB:1,54
8	3/1/14	1	Equivalence between two FSM’s	1,2, 3	TB:1,44
9	6/1/14	2	Finite Automata with output- Moore and Melay machines	1,2, 3	TB:1,61
10	9/1/14	1	Finite Automata with output- Moore and Melay machines	1,2, 3	TB:1,61

Signature of Faculty
Date

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
2. ADDITIONAL TOPICS COVERED, IF ANY, MAY ALSO BE SPECIFIED **BOLDLY**.
MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

	SCHEDULE OF INSTRUCTIONS UNIT - III	2013-14 Regulation: R11

FACULTY DETAILS:

Name of the Faculty:: D.HIMAGIRI
Designation: Asst.Professor
Department:: CSE

The Schedule for the whole Course / Subject is::

Sl. No.	Date	No. of Periods	Topics / Sub - Topics	Objectives & Outcome Nos.	References (Text Book, Journal…) Page No___ to ___
1	21/1/14	1	Regular sets, regular expressions	1,5	TB:1,102
2	22/1/14	1	regular expressions,Identity rules	1,5	
3	24/1/14	2	Constructing finite Automata for a given regular expressions	1,5	TB:1,106
4	27/1/14	2	Conversion of Finite Automata to Regular expressions	1,5	TB:1,110
5	29/1/14	1	Pumping lemma of regular sets	1,5	TB:1,115
6	30/1/14	1	closure properties of regular sets	1,5	TB:1,122

Signature of Faculty
Date

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
2. ADDITIONAL TOPICS COVERED, IF ANY, MAY ALSO BE SPECIFIED **BOLDLY**.

MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

	SCHEDULE OF INSTRUCTIONS UNIT - IV	2013-14 Regulation: R11

FACULTY DETAILS:

Name of the Faculty:: D.HIMAGIRI
Designation: Asst.Professor
Department:: CSE

The Schedule for the whole Course / Subject is::

Sl. No.	Date	No. of Periods	Topics / Sub - Topics	Objectives & Outcome Nos.	References (Text Book, Journal…) Page No___ to ___
1	31/1/14	1	Regular grammars-right linear and left linear grammars	4	TB:1,148
2	2/2/14	1	equivalence between regular linear grammar	4	TB:1,160
3	3/2/14	2	FA inter conversion	4	TB:1,156
4	4/2/14	1	Context free grammar	4	TB:1,148
5	5/2/14	2	derivation trees	4	TB:1,151
6	6/2/14	1	Sentential forms	4	TB:1,153
7	7/2/14	1	Right most and leftmost derivation of strings	4	TB:1,153

Signature of Faculty
Date

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
2. ADDITIONAL TOPICS COVERED, IF ANY, MAY ALSO BE SPECIFIED **BOLDLY**.

MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

	SCHEDULE OF INSTRUCTIONS UNIT - V	2013-14 Regulation: R11

FACULTY DETAILS:

Name of the Faculty:: D.HIMAGIRI
Designation: Asst.Professor
Department:: CSE
The Schedule for the whole Course / Subject is::

Sl. No.	Date	No. of Periods	Topics / Sub - Topics	Objectives & Outcome Nos.	References (Text Book, Journal…) Page No___ to ___
1	17/2/14	1	Ambiguity in context free grammars	4	TB:1,156
2	19/2/14	2	Minimisation of Context Free Grammars	4	TB:1,166
3	20/2/14	1	Chomsky normal form	4	TB:1,166
4	23/2/14	1	Greiback normal form	4	TB:1,170
5	25/2/14	2	Pumping Lemma for Context Free Languages	4	TB:1,173
6	26/2/14	1	Enumeration of properties of CFL	4	TB:1,180

Signature of Faculty
Date

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.

2. ADDITIONAL TOPICS COVERED, IF ANY, MAY ALSO BE SPECIFIED **BOLDLY**.

MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

	SCHEDULE OF INSTRUCTIONS UNIT - VI	2013-14 Regulation: R11

FACULTY DETAILS:

Name of the Faculty:: D.HIMAGIRI
Designation: Asst.Professor
Department:: CSE

The Schedule for the whole Course / Subject is::

Sl. No.	Date	No. of Periods	Topics / Sub - Topics	Objectives & Outcome Nos.	References (Text Book, Journal…) Page No___ to ___
1	27/2/14	1	Push down automata	7	TB:1,201
2	2/3/14	1	definition, model	7	TB:1,201
3	3/3/14	2	acceptance of CFL	7	TB:1,209
4	5/3/14	2	Acceptance by final state and acceptance by empty state and its equivalence	7	TB:1,215
5	6/3/14	1	Acceptance by final state and acceptance by empty state and its equivalence	7	TB:1,215
6	8/3/14	2	Equivalence of CFL and PDA, interconversion	7	TB:1,222
7	10/3/14	1	Introduction to DCFL and DPDA.	7	TB:1,223

Signature of Faculty
Date

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.

2. ADDITIONAL TOPICS COVERED, IF ANY, MAY ALSO BE SPECIFIED **BOLDLY**.

MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

	SCHEDULE OF INSTRUCTIONS UNIT - VII	2013-14 Regulation: R11

FACULTY DETAILS:

Name of the Faculty:: D.HIMAGIRI
Designation: Asst.Professor
Department:: CSE

The Schedule for the whole Course / Subject is::

Sl. No.	Date	No. of Periods	Topics / Sub - Topics	Objectives & Outcome Nos.	References (Text Book, Journal…) Page No___ to ___
1	11/3/14	1	Turing Machine, definition	6	TB:1,235
2	13/3/14	2	model, design of TM	6	TB:1,235
3	16/3/14	2	Computable functions	6	TB:1,237
4	18/3/14	1	recursively enumerable languages	6	TB:1,258
5	20/3/14	2	Church's hypothesis, counter machine	6	TB:1,253
6	21/3/14	1	types of Turing machines	6	TB:1,249

Signature of Faculty
Date

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
2. ADDITIONAL TOPICS COVERED, IF ANY, MAY ALSO BE SPECIFIED **BOLDLY**.

MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

	SCHEDULE OF INSTRUCTIONS UNIT - VIII	2013-14 Regulation: R11

FACULTY DETAILS:

Name of the Faculty:: D.HIMAGIRI
Designation: Asst.Professor
Department:: CSE

The Schedule for the whole Course / Subject is::

Sl. No.	Date	No. of Periods	Topics / Sub - Topics	Objectives & Outcome Nos.	References (Text Book, Journal…) Page No___ to ___
1	23/3/14	1	Chomsky hierarchy of languages	8,9	TB:1,258
2	25/3/14	2	linear bounded automata and context sensitive language, LR(0) grammar	8,9	TB:1,337
3	28/3/14	1	Decidability of, problems, Universal Turing Machine	8,9	TB:1,255
4	31/3/14	1	Undecidability of posts. Correspondence problem	8,9	TB:1,283
5	2/4/14	1	Turing reducibility, Definition of P and NP problems.	8,9	TB:1,311
6	4/4/14	2	Definition of P and NP problems, NP complete and NP hard problems.	8,9	TB:1,316

Signature of Faculty
Date

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
2. ADDITIONAL TOPICS COVERED, IF ANY, MAY ALSO BE SPECIFIED **BOLDLY**.

MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

	COURSE COMPLETION STATUS	2013-14
		Regulation: R11

FACULTY DETAILS:

Name of the Faculty:: D.HIMAGIRI

Designation: Asst.Professor

Department:: CSE

Actual Date of Completion & Remarks, if any

Units	Remarks	Nos. of Objectives Achieved
Unit 1	NO	1,2
Unit 2	NO	1,2,5
Unit 3	NO	3,4
Unit 4	NO	4
Unit 5	NO	4
Unit 6	NO	7
Unit 7	NO	6
Unit 8	NO	8,9

Signature of Dean of School
Date:

Signature of Faculty
Date:

NOTE: AFTER THE COMPLETION OF EACH UNIT MENTION THE NUMBER OF OBJECTIVES ACHIEVED.

	TUTORIAL SHEETS - I	2013-14
		Regulation: R11

FACULTY DETAILS:

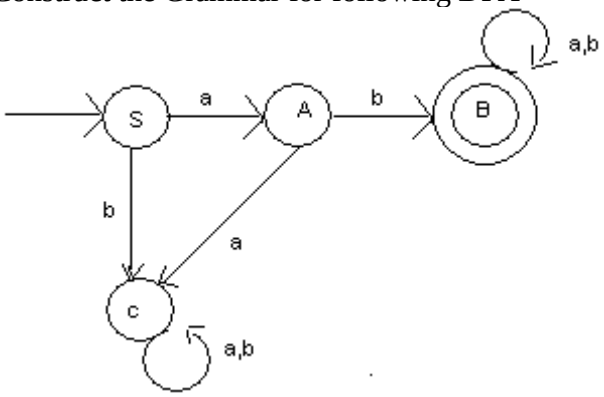
Name of the Faculty:: D.HIMAGIRI
Designation: Asst.Professor
Department:: CSE
The Schedule for the whole Course / Subject is::

Date:

This Tutorial corresponds to Unit Nos.1-4 Time:

Q1.

Construct the Grammar for following DFA

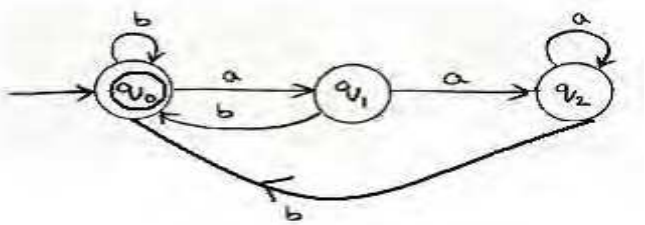


obj-1

Q2.

a.)Differentiate between Moore and Melay machines. Obj-2,3

b.) Construct regular expression for following FA



obj-1

Explain i) E-closure obj-1,2,3
ii) E-NFA

Q3.

a)Explain the equivalence of two Finite Automata. Obj-1,2,3

b) Convert the regular expression to NFA : $0^*(1+0)+01^*$

Q4.

Minimize the following DFA using Myhill Nerode theorem obj-5

states	0	1
-->A	B	A
B	A	C
C	D	B
*D	D	A
E	D	F
F	G	E
G	F	G
H	G	D

Q5.

Convert the following Left Linear Grammar to NFA obj-1

S-->Ab/ab, A--->Ab/Bb, B--->Ba/a

Please write the Questions / Problems / Exercises which you would like to give to the students and also mention the objectives to which these questions / Problems are related.

Signature of Dean of School
Date:

Signature of Faculty
Date:

	TUTORIAL SHEETS - II	2013-14
		Regulation: R11

FACULTY DETAILS:

Name of the Faculty:: D.HIMAGIRI
Designation: Asst.Professor
Department:: CSE
The Schedule for the whole Course / Subject is::

Date:

This Tutorial corresponds to Unit Nos.1-8 Time:

Q1.

Convert the following Grammar to NFA obj-1

S---->01A/10B
A---->01C/01
B----->10D/10
C------>01A
D------>10B

Q2.

Convert following (epsilon**)ε-** NFA to DFA obj1,2,3

states	a	b	c	**ε**
->A	A	Ø	Ø	B
B	Ø	B	Ø	C
*C	Ø	Ø	C	Ø

Q3.

Obj4

Convert to CNF

s->ASA|aB
A->B|S
B->b|**ε**

Q4.

Design a push automata which accepts $L=a^pb^qc^m|p+m=q$ obj-7

Q5.

Convert CFG to PDA obj-7

S->aAA
A->aS|bS|a

Please write the Questions / Problems / Exercises which you would like to give to the students and also mention the objectives to which these questions / Problems are related.

Signature of Dean of School
Date:

Signature of Faculty
Date:

	TUTORIAL SHEETS - III	2013-14
		Regulation: R11

FACULTY DETAILS:

Name of the Faculty:: D.HIMAGIRI
Designation: Asst.Professor
Department:: CSE

Date:

This Tutorial corresponds to Unit Nos. 5-8 Time:

Q1.

Convert to CNF obj-4

s->**ε|(S)|SS**

Q2.

Design Turing Machine for obj-6

$A^{2n}b^{n}|n>0$

Q3.

Show that the travelling salesman problem is in class NP obj-8,9

Q4.

Construct LR(0) grammar obj-6,8,9

A->aAa|B
B->b

Q5.

Check LL(1) obj-6,8,9

S->AaBb|BbBa
A->**ε**
B->ε

Please write the Questions / Problems / Exercises which you would like to give to the students and also mention the objectives to which these questions / Problems are related.

Signature of Dean of School
Date:

Signature of Faculty
Date:

	ILLUSTRATIVE VERBS FOR STATING INSTRUCTIONAL OBJECTIVES	2013-14
		Regulation: R11

These verbs can also be used while framing questions for Continuous Assessment Examinations as well as for End – Semester (final) Examinations.

ILLUSTRATIVE VERBS FOR STATING **GENERAL OBJECTIVES**

Know Comprehend	Understand Apply	Analyze Design	Generate Evaluate

ILLUSTRATIVE VERBS FOR STATING **SPECIFIC OBJECTIVES:**

A. Cognitive Domain

1	2	3	4	5	6
Knowledge	**Comprehension Understanding**	**Application** of knowledge & comprehension	**Analysis** of whole w.r.t. its constituents	**Synthesis** combination of ideas/constituents	**Evaluation** judgement
Define	Convert	Change	Breakdown	Categorize	Appraise
Identify	Defend	Compute	Differentiate	Combine	Compare
Label	Describe (a	Demonstrate	Discriminate	Compile	Conclude
List	procedure)	Deduce	Distinguish	Compose	Contrast
Match	Distinguish	Manipulate	Separate	Create	Criticize
Reproduce	Estimate	Modify	Subdivide	Devise	Justify
Select	Explain why/how	Predict		Design	Interpret
State	Extend	Prepare		Generate	Support
	Generalize	Relate		Organize	
	Give examples	Show		Plan	
	Illustrate	Solve		Rearrange	
	Infer			Reconstruct	
	Summarize			Reorganize	
				Revise	

B. Affective Domain		**C. Psychomotor Domain (skill development)**				
Adhere	Resolve	Bend	Dissect	Insert	Perform	Straighten
Assist	Select	Calibrate	Draw	Keep	Prepare	Strengthen
Attend	Serve	Compress	Extend	Elongate	Remove	Time
Change	Share	Conduct	Feed	Limit	Replace	Transfer
Develop		Connect	File	Manipulate	Report	Type
Help		Convert	Grow	Move preciselyReset		Weigh
Influence		Decrease	Handle	Operate	Run	
Initiate		Demonstrate	Increase	Paint	Set	

	LESSON PLAN **Unit-1**	2013-14 Regulation: R11

Name of the Faculty: D.HIMAGIRI

Subject FLAT Subject Code

Unit

INSTRUCTIONAL OBJECTIVES:

Session No	Topics to be covered	Time	Ref	Teaching Method
1	Strings,alphabets,languages,operations	50	TB1	Board
2	Finite automata model,acceptance of strings	50	TB1	Board
3	DFA,NFA,	50	TB1	Board
4	Transition diagrams	50	TB1	Board
5	Language recognizers	50	TB1	Board
6	Problems	50	TB1	Board

On completion of this lesson the student shall be able to(Outcomes)

1. Understand basic properties of formal languages and formal grammars.
2. Understand basic properties of deterministic and nondeterministic finite automata

	ASSIGNMENT **Unit-I**	2013-14 Regulation: R11

1.) If R=(a,b)(b,c)(c,a),find R^+,R^*obj-1

2.)Design a DFA that accepts even number of 0's and even number of 1's. Obj-2,3

3.)Design a NFA and DFA accepting all strings ending with 01 over Σ={0,1}.Obj-2,3

Signature of Faculty

Note: Mention for each question the relevant objectives and outcomes.

	LESSON PLAN **Unit-II**	2013-14 Regulation: R11

Name of the Faculty: D.HIMAGIRI

Subject FLAT Subject Code

Unit

INSTRUCTIONAL OBJECTIVES:

Session No	Topics to be covered	Time	Ref	Teaching Method
1	NFA with I transitions	50	TB1	Board
2	Significance, acceptance of languages	50	TB1	Board
3	Equivalence between NFA with and without Î transitions	50	TB1	Board
4	NFA to DFA conversion	50	TB1	Board
5	minimisation of FSM	50	TB1	Board
6	Moore and Melay machines.	50	TB1	Board
7	Moore and Melay machines.	50	TB1	Board

On completion of this lesson the student shall be able to

1. Understand basic properties of formal languages and formal grammars.
2. Understand basic properties of deterministic and nondeterministic finite automata
3. Understanding the minimization of deterministic and nondeterministic finite automata.

	ASSIGNMENT **Unit-II**	2013-14 Regulation: R11

1.) Differentiate between Moore and Melay machines. Obj-2,3

2.)
Minimize the following DFA Obj-2,3,5

states	**0**	**1**
-->A	B	A
B	A	C
C	D	B
*D	D	A
E	D	F
F	G	E
G	F	G
H	G	D

3.)
Convert following (epsilon**)ε-** NFA to DFAObj-2,3

states	a	b	c	**ε**
->A	A	Ø	Ø	B
B	Ø	B	Ø	C
*C	Ø	Ø	C	Ø

Signature of Faculty

Note: Mention for each question the relevant objectives and outcomes.

	LESSON PLAN **Unit-III**	2013-14 Regulation: R11

Name of the Faculty: D.HIMAGIRI

Subject FLAT Subject Code

Unit

INSTRUCTIONAL OBJECTIVES:

Session No	Topics to be covered	Time	Ref	Teaching Method
1	Regular sets, regular expressions, identity rules,	50	TB1	Board
2	Constructing finite Automata for a given regular expressions	50	TB1	Board
3	Conversion of Finite Automata to Regular expressions	50	TB1	Board
4	Pumping lemma of regular sets	50	TB1	Board
5	closure properties of regular sets	50	TB1	Board
6	Pumping lemma of regular sets problems	50	TB1	Board
7	Problems, practice	50	TB1	Board

On completion of this lesson the student shall be able to(Outcomes)

1. Understand the relation between types of languages and types of finite automata
2. Understanding the Context free languages and grammers, and also Normalising CFG.

	ASSIGNMENT **Unit-III**	2013-14 Regulation: R11

1.) Construct regular expression $(1+0)0^*$ Obj-2,3

2.)Construct NFA for following grammar Obj-1,2,3

S->Ab|ab
A->Ab|Bb
B->Ba|a

3.)State Definition of Pumping Lemma for regular sets.Obj-2,3

Assignment / Questions

Signature of Faculty

Note: Mention for each question the relevant objectives and outcomes.

	LESSON PLAN **Unit-IV**	2013-14 Regulation: R11

Name of the Faculty: D.HIMAGIRI

Subject FLAT Subject Code

Unit

INSTRUCTIONAL OBJECTIVES:

Session No	Topics to be covered	Time	Ref	Teaching Method
1	Regular grammars-right linear and left linear grammars	50	TB1	Board
2	equivalence between regular linear grammar and FA.	50	TB1	Board
3	inter conversion	50	TB1	Board
4	Context free grammar	50	TB1	Board
5	derivation trees, sentential forms.	50	TB1	Board
6	Right most and leftmost derivation of strings.	50	TB1	Board
7	problems	50	TB1	Board

On completion of this lesson the student shall be able to (Outcomes)

1. Understand the relation between types of languages and types of finite automata
2. Understanding the Context free languages and grammers, and also Normalising CFG.

	ASSIGNMENT **Unit-IV**	2013-14 Regulation: R11

1.)Give CFG for R.E $(011+1)^*(01)^*$ Obj-1

2.)Check whether grammar is ambiguous or not Obj-1

S->iCtS|iCtSes|a
C->b

3.)Derive 'abbaaba'Obj-1

S->XaaX
X->aX|bX

Signature of Faculty

Note: Mention for each question the relevant objectives and outcomes.

	LESSON PLAN **Unit-V**	2013-14 Regulation: R11

Name of the Faculty: D.HIMAGIRI

Subject FLAT Subject Code

Unit

INSTRUCTIONAL OBJECTIVES:

Session No	Topics to be covered	Time	Ref	Teaching Method
1	Ambiguity in context free grammars	50	TB1	Board
2	Minimisation of Context Free Grammars	50	TB1	Board
3	Chomsky normal form	50	TB1	Board
4	Greiback normal form	50	TB1	Board
5	Pumping Lemma for Context Free Languages	50	TB1	Board

On completion of this lesson the student shall be able to(Outcomes)

1. Understanding the Context free languages and grammers, and also Normalising CFG.

	ASSIGNMENT **Unit-V**	2013-14 Regulation: R11

1.)Simplify the following grammar Obj-4

S->aA|aBB
A->aAA|□
B->bB|bbC
C->B

2.)Convert CFG to CNF Obj-4

S->ASB|□
A->aAS|a
B->bb|SbS|A

3.)Convert the CFG to GNF Obj-4

S->ABA
A->aA|□
B->bB|□

Assignment / Questions

Signature of Faculty

Note: Mention for each question the relevant objectives and outcomes.

	LESSON PLAN **Unit-VI**	2013-14 Regulation: R11

Name of the Faculty: D.HIMAGIRI

Subject FLAT Subject Code

Unit

INSTRUCTIONAL OBJECTIVES:

Session No	Topics to be covered	Time	Ref	Teaching Method
1	Push down automata, definition	50	TB1	Board
2	model, acceptance of CFL	50	TB1	Board
3	Acceptance by final state and acceptance by empty state and its equivalence	50	TB1	Board
4	Equivalence of CFL and PDA	50	TB1	Board
5	interconversion.	50	TB1	Board
6	Introduction to DCFL and DPDA.	50	TB1	Board
7	Problems	50	TB1	Board

On completion of this lesson the student shall be able to (Outcomes)

1.)Understanding the minimization of deterministic and nondeterministic finite automata.

2.)Understand the concept of Pushdown automata and its application.

	ASSIGNMENT **Unit-VI**	2013-14 Regulation: R11

1.)Design a pushdown automata which accepts equal number of a,s and b,s over □={a,b}Obj-7

2.)Construct a PDAObj-7

S->aAA
A->aS|bS|a

3.)Design two stack PDA for L={$a^n b^n a^n b^n$ |n□N}.Obj-7

Signature of Faculty

Note: Mention for each question the relevant objectives and outcomes.

	LESSON PLAN **Unit-VII**	2013-14 Regulation: R11

Name of the Faculty: D.HIMAGIRI

Subject FLAT Subject Code

Unit

INSTRUCTIONAL OBJECTIVES:

Session No	Topics to be covered	Time	Ref	Teaching Method
1	Turing Machine, definition	50	TB1	Board
2	model, design of TM	50	TB1	Board
3	Computable functions	50	TB1	Board
4	recursively enumerable languages.	50	TB1	Board
5	Church's hypothesis	50	TB1	Board
6	counter machine	50	TB1	Board
7	types of Turing machines	50	TB1	Board
8	problems	50	TB1	Board

On completion of this lesson the student shall be able to

1. Understanding the minimization of deterministic and nondeterministic finite automata.
2. Understand basic properties of Turing machines and computing with Turing machines.

	ASSIGNMENT **Unit-VII**	2013-14
		Regulation: R11

1.)Design a Turing machine to add two numbers.Obj-7

2.)Design the turing machine which can shift the data on tape by two spaces.Obj-7

3.)Design a turing machine for function f(x,y)=x(x+y).Obj-7

Signature of Faculty

Note: Mention for each question the relevant objectives and outcomes.

	LESSON PLAN **Unit-VIII**	2013-14 Regulation: R11

Name of the Faculty: D.HIMAGIRI

Subject FLAT Subject Code

Unit VIII

INSTRUCTIONAL OBJECTIVES:

Session No	Topics to be covered	Time	Ref	Teaching Method
1	Chomsky hierarchy of languages	50	TB1	Board
2	linear bounded automata and context sensitive language, LR(0) grammar	50	TB1	Board
3	decidability of, problems, Universal Turing Machine	50	TB1	Board
4	undecidability of posts	50	TB1	Board
5	Correspondence problem, Turing reducibility	50	TB1	Board
6	Definition of P and NP problems	50	TB1	Board

On completion of this lesson the student shall be able to

1.) Understand the concepts of tractability and decidability, the concepts of NP-completeness and NP-hard problem.

2.) Understand the challenges for Theoretical Computer Science and its contribution to other sciences

	ASSIGNMENT **Unit-VIII**	2013-14
		Regulation: R11

1.)Give some examples of problems in different classes. Obj-8,9

2.)Show that kruskals algorithm is in class P.Obj-8,9

3.)Show that the satisfiability problem is in class NP.Obj-8,9

Signature of Faculty

Note: Mention for each question the relevant objectives and outcomes.