COURSE STRUCTURE & SYLLABUS OF
BACHELOR OF TECHNOLOGY (B.TECH)

In

COMPUTER SCIENCE

Course Structure

Fourth Year

Eighth Semester

Paper Code	Name of the Subject
BECO6	Design principle of language Translator
BECO7	Design & Analysis of Algorithm
BECO8	Interactive multimedia
BECO9	Project
BECO7P	Design & Analysis of Algorithm

BECO6 : DESIGN PRINCIPLE OF LANGUAGE TRANSLATOR

1. INTRODUCTION

Systems Programs and Translators, the Relationship between High-Level Languages and Translators

2. OVERVIEW OF COMPILER STRUCTURE

Compilers, the analysis-synthesis model of co mpilation, analysis of the source program, lexical analysis, semantic analysis, analysis in text formatters, the phases o f a compiler, symbol-table management, error detection and reporting, the analysis phases, intermediate code generation, code optimization, code generation, code generation, assemblers, two-pass assembly, loaders and link-editors, the grouping of phases, compiler-construction tools

3. BASICS OF GRAMMAR THEORY

Equivalent grammars , some simple restrictions on grammars , useless productions and reduced grammars , cycle-free grammars , ambiguous grammars , context sensitivity , the chomsky hierarchy , bnf description of clang , ebnf description of clang , a sample program .

4. FINITE STATE AUTOMATA AND LEXICAL ANALYSIS

Abstract machines, the role of the lexical analyzer, issues in lexical analysis, tokens, patterns, lexemes, attributes for tokens, input buffering, buffer pairs, specification of tokens.

5. SPECIFICATION AND RECOGNITION OF CONTEXT FREE GRAMMARS

Context-free grammars, generating strings from a cfg, cfgs with epsilon productions, finding all the strings generated by a cfg, cfgs vs regular expressions, s imulating a regular expression with a cfg, a cfg with no corresponding re

6. PARSING TECHNIQUES

Top-do wn parsing, recursive-descent parsing, predictive parsers, translation diagrams for predictive parsers, no recursive predictive parsing, first and follow, bottom-up parsin g, handles, handle pruning, stack implementation of shift-reduce parsing, viable prefixes, operator-precedence parsing, using operator-precedence relations, operator-precedence relations from associativity and precedence, precedence functions, lr parsers, constructing slr parsing tables

7. SYNTAX DIRECTED TRANSLATION

Embedding semantic actions into s yntax rules, attribute grammars, synthesized and inherited attributes , classes of attribute grammars

8. SEMANTIC ACTIONS AND INTERMEDIATE CODES

Intermediate languages, graphical representations, three-address code, types of three-address statements, syntax-directed translation into three-address code, implementations of three-address statements

9. STATIC AND DYNAMIC STORAGE MANAGEMENT

Static and dynamic memory allocation, array allocation and access, a simple static array allocation scheme

10. ERROR DETECTION AND RECOVERY

Classification of errors , lexical and syntax errors, duplicate messages , reco very from syntax errors, regarding a safe parser state , semantic erro rs, the error print routine, desirable place for printing error messages , invalid number of dimensions for 'h' in statements, object modules and compilation errors , detection of run time errors, indication of run time errors, overflo w in statement number 0052 of procedure xyz., programmer recovery options, debugging aids and options, combining different language routines

11. CODE GENERATION AND OPTIMIZATION

Issues in the design of a code generator, the target machine , peephole optimizatio n, code optimization, introduction, criteria for code-improving transformation , the principal sources of optimization, dead-co de eliminatio n, induction variables and reduction in strength, optimizatio n of basic blocks

12. INTRODUCTION TO NATURAL LANGUAGE TRANSLATION

Introduction, what is understanding?, what makes understanding hard?, co mplexity of the target representation, type of mapping, level of interaction amo ng components, conclusion: English is hard , understanding single sentences, understanding words, understanding sentences-syntax, semantics, pragmatics, keyword matching, syntactic analysis, classes of grammars and languages, semantic analysis, semantic grammars, conceptual dependency.

BECO7: DESIGN & ANALYSIS OF ALGORITHM

1. INTRODUCTION

2. THE BASIC STEPS IN THE DEVELOPMENT OF AN ALGORITHM

The Problem-Solving Aspect, Implementation Of Algorithms, Program Verification, The Efficiency Of Algorithms, The Order Notatio n

3. SOME DATA STRUCTURE

Stacks and q ueues, trees, binary trees, heaps and heapsort, graphs, hashing.

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4. **ELEMENTARY NOTIONS FROM PROBABILITY AND STATISTICS**
Probability, Axioms Of Probability, Discrete Probability Distributions, Bayes's Theorem, District Random Variables, Statistics,Linearity, Arithmetic Series

5. **HEURISTICS: TRAVELING SALESPERSON PROBLEM**
Traveling Salep erson Problem, Efficiency Considerations

6. **BRANCH AND BOUND PROBLEM**
The Method, Lc-Search, Control Abstractions For Lc-Search, Properties Of Lc-Search, Boundin g, Lc Branch-And-Bound

7. **RECURSION AND BACKTRACK PROGRAMMING**
Introduction, When Not To Use Recursion, Two Examples Of Recursive Programs, Backtrack Programming, The Eight Queens Problem, The Stable Marriage Prob lem, The Optimal Selection Problem

8. **SHORTEST PATHS PROBLEM**
Un weighted Shortest Paths, Dijkstra's Algorithm, Acyclic Graphs, Prim's Algorithm, Kruskal's Algorithm

9. **SORTING**
General Back ground, Efficiency Consideration, Efficiency Of Sorting, Exchange Sorts, Quicksort, Efficiency Of Quick Sort, Binary Tree Sorts, Heapsort, Insertion Sorts, Shell Sort

10. **SEARCHING**
Basic Search Techniques, Algorithmic Notation, Sequential Searching, Efficiency Of Sequential Searching, Reordering A List For Maximum Search Efficiency, Indexed Sequential Search, Binary Search, Interpolation Search

11. **ARITHMETIC AND LOGICAL EXPRESSIONS**
The General Method, Evaluation And Interpolation, Interpolation

12. **SETS AND SOME BASIC SET ALGORITHMS**
Sets, Relations, Function s, Sets And Disjoint Set Union

BECO8 INTERACTIVE MULTIMEDIA

1. **INTRODUCTION OF MULTIMEDIA:** What is Multimedia?, Introduction to making multimedia, Multimedia skills

2. **MULTIMEDIA BUILDING BLOCKS:** Text, Sound, Images, Animation, Video

3. **MULTIMEDIA HARDWARE AND SOFTWARE:** Macintosh and windows Production platforms, Basic software Tools, Multimedia Authoring tools

4. **MULTIMEDIA AND THE INTERNET:** The Internet and How it Works, Tools for the World Wide Web, Designing for the World Wide Web Assembling and delivering a project: Planning and Costing, Designing and p roducing, Content and Talent

BECO9P:- **Project Guideline**

Thinking up a Project

You are ex pected to come up with your own idea for a project. A wide range of topics is acceptable so long as there is substantial computing content and project is predominantly of a practical, problem-solving nature. You migh t take up an interest which you already have in your stream of engineering. You may do your project in any reputed organization or a dep artment. Individually or a group of maximum 4 students can take up a project. The project is a vehicle for you to demonstrate th e required level of competence in your chosen field of Bachelors.

Start thinking about your project right in the beginning. If you want to do the project in industrial environment start your correspondence fairly early to find an organization, which is ready to accept you You must submit an outline of your project (two or three pages) to your guide within one month of start of the project work. This must include the Title, Objective, Methodology (main steps to carry out a project), ex pected output and organization where you intend to carry out the project.

Arranging a Guide

When you have an idea of your project, even a tentative one, approach a suitable person who has interest and expertise in that area. The Guide may be a person with M.E. / M.Tech or a B.E./ B.Tech having a working experience of 3 years in relevant field.

Working with the Guide

The Guide's role is to provide support and encou ragement to direct the student's attention to relevant literature, to provide technical assistance occasionally, to read and comment on the draft report and to give guidance on the standard and amount of work required. The Guide is not responsible to teach an y new skills and language required for project work or for arran ging any literature or equipment. . Rest you can workout your own arran gement. The students, who are content to carr y out their work largely without supervision, should keep their Guide in touch with what they are doing. A student should not remain silent for months and then appear with a complete project work unknown to supervisor. In such circu mstances, the Guide cannot be counted on to give an automatic seal of his approval. If a project produces a piece of software, the Guide would normally expect to see a demonstration of the software in action.

The main purpose of the report is to explain what you did in your project. The reader should be able to see clearly what you set out to do and what you achieved. It should describe the problem addresses and explain why you tackled it in the way you did. It should include your own assessment of how successful the project was.

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Resist temptation to include pages of padding. If the project consists of developing an application in area with which a computer scientist would not be familiar – such as chemical testing, stock & shar es – it might be necessary to include some explanatory company/ organization profile for whom you h ave done the work must not appear in chapters and must go to appendix part.

The work that is presented for examiners should be your own. The presentation of another person's work, design or program as though they are your o wn is a serious examination offence. Direct quotation form the work of others (published or un published) must always be clearly identified as such b y bein g placed in quotation marks, it is essential that reader should be able to see wh ere the other work ends and your begins.

Sometimes a project containing good work is marred by a report, which is turgid, obscure and simply ungrammatical. In such cases, it is very difficult to find out the work done during the project. An examiner cannot be kind enough to look properly on a project that is almost unreadable.

Some important points for carrying out a project

The organizations or companies offer you a placement for project work out of good will or to get some useful work done. Usually the companies do not provide you everything required by you. You must settle this right in the b eginning of the project with the business that what will you get from them and what you have to arran ge yourself.

Some times a complication arises due to the fact that some aspect of your project work is considered confidential by the company. If this is so, it is your responsibility to get whatever clearance is necessar y from th e organization righ t in the beginning as essential parts like system analysis and design, flow charts etc. can not be missing from a project report.

Make sure you allow enough time for writing report. It is strongly recommended that do some writing work as you carry out the project rather than leaving write up until the end. You must allow at least a month to finally write the report. There has to be enough time for the supervisor to read and comment on it and for student to make changes (sometimes ex tensive) on the basis of the comments. You may have to prepare two or three drafts before the final submission. Remember that it is mainly the p roject reports that get examined. An external supervisor receives a pile of project reports written by people who he does not know. If a project produced some software he even may not get time to see it running. In most cases he forms his judgment purely on the basis of the report. Please make your report as readable as possible content wise as well as presentation wise.

1. **Introduction:** This must contain background, any previous work done in the area of your project, your objective and other relevant material that may be helpful to further explain your project work.

2. **The existing system:** The study of the present system; problems in existing system.
3. **System design:** The proposed system; Any specific problem encountered at how you handled them.
4. **Implementation of the system:** Implementation issues and their justification.
5. **Conclusions:** Any shortcoming; your assessment of your work; comparison of your work with similar works; silent features of your work any feature modification. Real times applications of your project work.

References must be given at the end following any standard way of giving references.

For example:

Lan gd rof, ‘Theor y of Alternating Current Machiner y” Tata McGraw Hill, July 2003.

Finally, your project work is your brainchild and nobody knows about it more than you. Be confident to explain your work at the time of viva and b e honest to accept any short falls.

The Project Report Details

The report should b e prepared with the Word Processing software. They should be printed on A4 size (Executive Bond) paper. A margin of 1.5 inches must be allowed on left hand side for binding. The pages should be numbered. The report should be typed in the 12-font size with vertical spacin g of 1.5

Cover Page
Project Title
A Project Report

Submitted in partial fulfillment
of the degree of Bachelor of
Technology

Supervisor’s Name Student’s Name

LOGO

Sai Nath University
Ranchi, Jharkhand.

(Year)

A report should be hard bound (light green cover with golden print on the cover). The title of the project should be clearly visible on the cover.

The cover page should be as figures b elow. The first page should be title page containing the title, the candidates name, Enrolment Number, and Name of University. Second page is a certificate from the supervisor. The 3rd page is for the acknowledgement. Fourth page gives the contents of the project report. Fifth page should be an

abstract of the p roject followed by the chapters. You must ensure that all pages are legible. Where the project has produced software for a personal computer, you should include a CD inside the back cover of the report, along with instructions in the report how to run it.

Certificate by Supervisor Acknowledgment

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Contents Abstract

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