

## **PGCSE302D: Compiler Construction**

**Introduction:** Concept of Language processing system, phases of compilation. Compilers and interpreters. [1]

**Lexical Analysis:** Background: finite automata, regular language, regular expression, regular expression to NFA, NFA to DFA conversion. Design of a lexical analyzer; Scanner generator (lex, flex). [5]

**Syntax Analysis (Parsing):** Context-free language and grammar, push-down automata; ambiguity. Operator precedence parsing. Top-down parsing: LL (1) grammar and parsing. Bottom-up parsing: LR Parsers (LR, Canonical LR and LALR), Parser generator (Yacc, Bison). [10]

**Semantic Analysis (Syntax-Directed definitions):** inherited and synthesized attributes, dependency graph, evaluation order, bottom up and top down evaluation of attributes, L- and S-attributed definitions. [4]

**Type checking:** Type systems, Specification of a simple type checker, Equivalence of type expressions, Type conversions. [3]

**Run-time environment:** Storage organization, activation tree, activation record, parameter passing, symbol table, dynamic storage allocation. [4]

**Symbol Table:** Structure, types, symbol attributes and management. [2]

**Intermediate Code Generation:** Translation of different language features, different types of intermediate forms. [2]

**Code generation:** Issues in the design of code generator, a simple code generator, Register allocation & assignment. [3]

**Code Improvement (optimization):** Introduction, Basic blocks & flow graphs, Transformation of basic blocks, Dag representation of basic blocks, Principal sources of optimization, Loops in flow graphs, Peephole optimization. [4]

**Advanced topics:** Compilation of object oriented programming languages. JVM and byte code. [2]

### **Text Book:**

1. Aho, Sethi, and Ullman, Compilers: Principles, Techniques and Tools, Addison-Wesley, 1988.

### **References:**

2. Fischer and LeBlanc, Crafting a Compiler, Benjamin Cummings, 1991.-

3. Holub, Compiler Design in C, Prentice-Hall Inc., 1993.

4. Fraser and Hanson, A retargetable C Compiler: Design and Implementation, Addison-Wesley. 1995

5. Dhamdhere, Compiler Construction, McMillan India. 1997

## **Management Paper for the Third Semester of PG Programme:**

There are three options for the 3<sup>rd</sup> semester Management Paper for all the **PG courses** offering the Management Paper in the **3<sup>rd</sup> semester**. Any one of the papers may be chosen and the information to be immediately communicated to the Controller of Examinations.

### **PG\*\*301A: PROJECT MANAGEMENT & ENTREPRENEURSHIP**

#### **COURSE DESCRIPTION**

THIS COURSE IS INTENDED TO BE AN INTRODUCTION TO THE FIELD OF PROJECT MANAGEMENT. THE PRIMARY OBJECTIVE OF THIS COURSE IS TO ACQUAINT STUDENTS WITH A BROAD BASIC OVERVIEW OF PROJECT MANAGEMENT, AND THE ROLE OF A PROJECT MANAGER THROUGHOUT THE FIVE PRIMARY PROCESSES OF MANAGING PROJECTS. THE OTHER THREE REQUIRED CORE COURSES WILL PROVIDE A MORE COMPREHENSIVE COVERAGE.

#### **SYLLABUS:**

Module – 1: WHAT “PROJECT MANAGEMENT” MEANS. ABOUT THE CONTEXT OF MODERN PROJECT MANAGEMENT. HOW TO MANAGE PROJECTS THROUGHOUT THE FIVE MAJOR PROCESS GROUPS. HOW THE TRIPLE CONSTRAINT AFFECTS THE PROJECT MANAGER. HOW TO DEVELOP AN EFFECTIVE PROJECT PLAN. HOW TO GAIN COMMITMENT TO THE PROJECT PLAN. HOW TO EFFICIENTLY EXECUTE THE PROJECT PLAN. HOW TO MINIMIZE OR ELIMINATE SCOPE CREEP. HOW TO ORGANIZE AND DEVELOP SUCCESSFUL PROJECT TEAMS. HOW TO DEVELOP AN EFFECTIVE PROJECT CONTROL SYSTEM. HOW TO DEVELOP REALISTIC PROJECT SCHEDULES. HOW TO EFFICIENTLY CLOSE OUT A PROJECT.

OBJECTIVES: TO DEVELOP AN APPRECIATION FOR THE EVOLUTION OF ENTREPRENEURSHIP AS AN ACADEMIC DISCIPLINE. TO GAIN UNDERSTANDING OF THE ENTREPRENEURIAL PROCESS THROUGH ANALYSIS OF VARIOUS SITUATIONS. TO LEARN DIVERSE RESEARCH THEMES IN THE AREA OF ENTREPRENEURSHIP

#### **COURSE FORMAT:**

#### **SYLLABUS**

##### **Module -2:**

ENTREPRENEURSHIP IS AN INTENSIVE COURSE INVOLVING THE STUDY OF JOURNALS ARTICLES, ANALYSIS OF CASES, TO EVOLVE PERSPECTIVE ON ENTREPRENEURSHIP AS AN ACADEMIC DISCIPLINE

##### **Module -3:**

ENTREPRENEURSHIP: AN INTRODUCTION, NEW VENTURE CREATION, FINANCING ENTREPRENEURIAL VENTURES AND THE BUSINESS PLAN, FAMILY BUSINESS MANAGEMENT, MANAGING A GROWING BUSINESS, VENTURE GROWTH STRATEGIES, ENTREPRENEURIAL SKILLS AND STRATEGIES, ENTREPRENEURIAL SKILLS AND STRATEGIES, INTRAPRENEURSHIP:

ENTREPRENEURIAL VENTURES IN A CORPORATE SETTING, ENTREPRENEUR AS CHANGE AGENT, SUSTAINABLE INNOVATION AND ENTREPRENEURSHIP, SOCIAL ENTREPRENEURSHIP

#### **REFERENCE BOOKS:**

1. M. Y. YOSHINO AND U. S. RANGAN, STRATEGIC ALLIANCES: AN ENTREPRENEURIAL APPROACH TO GLOBALIZATION, HBS PRESS, 1995.
2. FOSTER, RICHARD N., INNOVATION: THE ATTACKER'S ADVANTAGE, LONDON, MACMILLAN, 1986.
3. HOWARD H. STEVENSON, MICHAEL J. ROBERTS, AMAR BHIDE, WILLIAM A. SAHLMAN (EDITOR), THE ENTREPRENEURIAL VENTURE (THE PRACTICE OF MANAGEMENT SERIES).
4. UDAYAN GUPTA (EDITOR), DONE DEALS: VENTURE CAPITALISTS TELL THEIR STORIES.
5. STEVE KEMPER, CODE NAME GINGER: THE STORY BEHIND SEGWAY AND DEAN
6. KAMEN'S QUEST TO INVENT A NEW WORLD.
7. PAUL A. GOMPERS AND JOSH LERNER, THE MONEY OF INVENTION: HOW VENTURE CAPITAL CREATES NEW WEALTH.
8. LARRY BOSSIDY, RAM CHARAN AND CHARLES BURCK, EXECUTION: THE DISCIPLINE OF GETTING THINGS DONE.
9. JEFFRY TIMMONS AND STEPHEN SPINELLI, NEW VENTURE CREATION: ENTREPRENEURSHIP FOR THE 21ST CENTURY WITH POWERWEB AND NEW BUSINESS MENTOR CD.
10. THE ENTREPRENEUR'S GUIDE TO BUSINESS LAW, CONSTANCE E. BAGLEY AND CRAIG E. DAUCHY, WEST EDUCATIONAL PUBLISHING, 1998.
11. MARY COULTER, ENTREPRENEURSHIP IN ACTION, PRENTICE-HALL, 2001.
12. TRACY KIDDER, THE SOUL OF A NEW MACHINE, AVON BOOKS, 1990.
13. H. L. MORGAN, A. KALLIANPUR, AND L. M. LODISH, ENTREPRENEURIAL MARKETING: LESSONS FROM WHARTON'S PIONEERING MBA COURSE, JOHN WILEY & SONS, 2001.
14. RITA GUNTHER MCGRATH AND IAN MACMILLAN, THE ENTREPRENEURIAL MINDSET.
15. JAMES COLLINS, WILLIAM C. LAZIER, BEYOND ENTREPRENEURSHIP: TURNING YOUR BUSINESS INTO AN ENDURING GREAT COMPANY.

#### **REFERENCE (LIST OF) CASES:**

16. KODAK (A), HBS CASE # 703503
17. COMMERCE BANK, HBS CASE # 603080
18. HAUSSER FOOD PRODUCTS CO., HBS CASE: 402055
19. E INK IN 2005, HBS CASE # 705506
20. WHOLE FOODS MARKET, INC., HBS CASE # 705476
21. DISCIPLINED ENTREPRENEURSHIP, HBS CASE # SMR156

## **PG\*\*301B: Teaching & Research Methodology**

Total Lecture Hours: 44

### **MODULE A: TEACHING METHODOLOGY [16 Lectures]**

**Unit 1** Instruction: Introduction to content, Elements of instruction, Learning objectives, Roles of the teacher and the learner in instruction. [4 Lectures]

**Unit 2** Teaching and Learning: Application of theories of learning to teaching and learning, Sequence of learning and Strategies of learning, Teaching methods, their merits and demerits, Use of ICT in teaching & learning, Classroom management, Individual differences. [4 Lectures]

**Unit 3** Planning for teaching and learning: Understanding the syllabus, Preparation of a scheme of work, Lesson plan preparation, Microteaching. [4 Lectures]

**Unit 4** Assessment and Evaluation: Define measurement, assessment, test, evaluation, Purpose of assessment and evaluation, Types of tests, Grading and reporting the results assessment, Evaluating teaching and learning. [4 Lectures]

### **MODULE B: RESEARCH METHODOLOGY [28 Lectures]**

**Unit 1** Definition and explanation of research: Types and Paradigms of Research, History and Philosophy of Research (esp. Philosophical evolution, pathways to major discoveries & inventions), Research Process decision, planning, conducting, Classification of Research Methods; Reflective Thinking, Scientific Thinking. Research problem formulation: Literature review- need, objective, principles, sources, functions & its documentation, problem formulation esp. sources, considerations & steps, Criteria of a good research problem, Defining and evaluating the research problem, Variables esp. types & conversion of concepts to variables. Research design esp.

Causality, algorithmic, quantitative and qualitative designs, Various types of designs. Characteristics of a good research design, problems and issues in research design;

Hypotheses: Construction, testing, types, errors; Design of experiments especially classification of designs and types of errors. [8 lectures]

**Unit 2** Problem solving:

Understanding the problem- unknowns, data & conditions, conditions - satisfiability, sufficiency, redundancy & contradiction, separation of parts of the problem and conditions, notations; devising a plan- connection between data and unknown, similar/related problems, reuse of previous solutions, rephrasing/transforming the problem, solving partial or related problem, transforming data and unknowns; carrying out the plan- esp. correctness of each step in multiple ways; evaluation of solution and method-checking correctness of solution, different derivations, utility of the solution. [5 lectures]

**Unit 3** Theoretical methods of research:

Algorithmic methods including probabilistic, soft computing, and numerical methods; Modeling and Simulation; Engineering Design & Optimization (techniques); Statistical methods in research: Central tendency, Dispersions, Skewness, Moments, Kurtosis, esp. Distributions, Time series, Overview of Non-parametric tests & Multivariate analysis; Emerging techniques in discrete mathematics, algorithms, probability-statistics, internet technology and software engineering, and their application to research in computer science and information technology . [8 lectures]

**Unit 4** Foundation of Hypothesis:

Meaning of assumption, postulate and hypothesis, nature of hypothesis, function and importance of hypothesis, Characteristics of good hypothesis, formulating hypothesis. [2 Lectures]

**Unit 5** Data & Reports:

Infrastructural setups for research; Methods of data collection esp. validity and reliability, Sampling; Data processing and Visualization especially Classification; Ethical issues especially. bias, Misuse of statistical methods, Common fallacies in reasoning. Research Funding & Intellectual Property; Research reports: Research Proposal & Report writing esp. Study objectives, study design, problems and limitations; Prototype micro-project report implementing a major part of all the above (compulsory assignment) [5 lectures]

Course guidelines:

Faculty member will introduce the elementary ideas of most of the topics with emphasis on 3-5 topics preferably from those that are highlighted.

Books:

1. Teaching Methodology, Caroline W. Ndirangu, African Virtual University.
2. R. Paneerselvan: Research Methodology, Prentice-Hall India
3. G. Polya, How to Solve It, Princeton University Press
4. Fundamental of Research Methodology and Statistics, Yogesh Kumar Singh, New Age International Publishers.
5. Research Methodology Methods and Techniques (Second Revised Edition), C.R.Kothari, New Age International Publishers.

## PROJECT DEVELOPMENT AND RESOURCE MANAGEMENT

**Code: PG\*\* 301C** \*\* stands for the course (eg: CSE, IT, ECE, EE, AEIE, etc)

Contacts: 4-0-0

Credits: 4

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MODULE 1: 11L

Research Methodology and Techniques:

Meaning of Research: Objective, Motivation and Types of research; Research Process: Its representation through flow chart; Sample Designing: Different types of sample designing; Testing of hypothesis; Chi-square test: A statistical measure of sampling analysis. 5L

Data collection and storing through Database Management Systems ; Concept of Data Warehouses and Data Marts; Concept of Multidimensional analysis of project data; Different types of statistical analysis through SQL. 6L

MODULE 2: 8L

Agreement on Trade-Related aspects of Intellectual Property Rights (TRIPS): What is Intellectual Property, Importance of IPR, Patent, Types of Patents, Patentable inventions, Application and Registration of patents, Who can apply, rights and duties of patentee, infringement and remedies. 5L

R&D activities in educational institutes, IPR and patent issues. 3L

MODULE 3: 15L

Management: Definition, Functions, Skills, Motivational Theories, Communication: Types, Nature, Importance, Channel richness, how to increase the effectiveness of organizational communication. 3L

Quality: Concept, Deciphering quality aspect of different products and services; Quality improvement; identification of potential areas. 3L

Basics of project management: Concept, Types, Productivity, Effectiveness & Competitiveness: Lifecycle of process, Feasibility, Viability, Cost- Benefit analysis, PERT and CPM, SWOT analysis, Resource smoothing and Resource Leveling through Critical Path Analysis (CPA), Simulation. 6L

Cost classification: Fixed cost, variable cost, semi-variable cost; Cost of Capital, Capital Budgeting , Budgeting; Master budget; Concept of Taxes Direct Tax and Indirect Tax. 3L

MODULE 4: 6L

Project Management – A case study. Application and techniques described in Module 1. Implementation Phase, Human aspects, Time estimation,

Text Book:

1. Management of Technology, Tarek M.Khalil, McGraw Hill, 2000
2. Financial Management, Text, Problems and Cases, M Y Khan & P.K.Jain, McGraw Hill
3. Financial Management: Principles And Applications, 10/e, Keown, Pearson Education India