

DETAILED SYLLABUS

SEMESTER I

VGENCC101- Listening and Speaking Skills in English

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Speech Sounds: Phonemic symbols – Vowels – Consonants – Syllables – Word stress – Stress in polysyllabic words – Stress in words used as different parts of speech – Sentence stress – Weak forms and strong forms – Intonation

Sample activities:

1. Practice reading aloud. Use a variety of texts including short stories, advertisement matter, brochures, etc.
2. Read out a passage and ask the students to identify the stressed and unstressed syllables.

Module 2

Basic Grammar: Articles - Nouns and prepositions - Subject-verb agreement -Phrasal verbs - Modals - Tenses - Conditionals – Prefixes and suffixes – Prepositions -Adverbs– Relative pronouns - Passives - Conjunctions - Embedded questions - Punctuation – Abbreviations-concord- collocations-phrasal verbs- idiomatic phrases

Sample activities:

1. Ask students to write a story/report/brochure, paying attention to the grammar.

Module 3

Listening: Active listening – Barriers to listening – Listening and note taking – Listening to announcements – Listening to news on the radio and television.

Sample activities:

1. Information gap activities (e.g. listen to a song and fill in the blanks in the lyrics given on a sheet)
2. Listen to BBC news/ a play (without visuals) and ask the students to report what they heard.

Module 4

Speaking- Fluency and pace of delivery – Art of small talk – Participating in conversations – Making a short formal speech – Describing people, place, events and things – Group discussion skills, interview skills and telephone skills.

Sample activities:

1. Conduct group discussion on issues on contemporary relevance.
2. Ask students to go around the campus and talk to people in the canteen, labs, other departments etc. and make new acquaintances.

Book of Study

1. English for Effective Communication. Oxford University Press, 2013.

References

1. Marks, Jonathan. English Pronunciation in Use. New Delhi: CUP, 2007.
2. Lynch, Tony. Study Listening. New Delhi: CUP, 2008.

VDAMGC101- Introduction to IT

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Computer characteristics: Speed, storage, accuracy, diligence; Digital signals, Binary System, ASCII; Historic Evolution of Computers; Classification of computers: Microcomputer, Minicomputer, mainframes, Supercomputers; Personal computers: Desktop, Laptops, Palmtop, Tablet PC; Hardware & Software; Von Neumann model.

Module 2

Hardware: CPU, Memory, Input devices, output devices. Memory units: RAM, ROM-different types: Flash memory; Auxiliary storage: Magnetic devices, Optical Devices; Floppy, Hard disk, Memory stick, CD, DVD, CD-Writer; Input devices - keyboard, mouse, scanner, speech input devices, digital camera, Touch screen, Joystick, Optical readers, bar code reader; Output devices: Display device, size and resolution; CRT, LCD; Printers: Dot-matrix, Inkjet, Laser; Plotters, Sound cards & speaker.

Module 3

Software: System software, Application software; concepts of files and folders, Introduction to Operating systems, Different types of operating systems: single user, multitasking, time-sharing multi-user; Booting, POST; Basic features of two GUI operating systems: Windows & Linux (Basic desk top management); Programming Languages, Compiler, Interpreter, Databases; Application softwares: Generic Features of Word processors, Spread sheets and Presentation softwares; Generic Introduction to Latex for scientific typesetting; Utilities and their use; Computer Viruses & Protection, Free software, open source.

Module 4

Computer Networks: Connecting computers, Requirements for a network: Server, Workstation, switch, router, network operating systems; Internet: brief history, World Wide Web, Websites, URL, browsers, search engines, search tips; Internet connections: ISP, Dial-up, cable modem, WLL, DSL, leased line; email, email software features (send receive, filter, attach, forward, copy, blind copy); characteristics of web-based systems, Web pages, introduction to HTML.

Book of Study

1. E. Balaguruswamy, Fundamentals of Computers, McGraw hill, 2014.

References

1. Dennis P Curtain, Information Technology: The Breaking wave, McGrawhill, 2014.

VDAMGC102-Calculus & Real Analysis

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Sets and sequences: Bounded and unbounded sets, supremum and infimum, neighbourhood of a point, limit point of a set, derived set, Bolzano-Weierstrass theorem (without proof), open and closed sets (definitions only). Sequences-Convergence and divergence of sequences, Bolzano-Weierstrass theorem, limit inferior and limit superior (Definitions and examples only), Cauchy's general principle of convergence, Cauchy sequences. Limits of some special sequences and algebra of sequences, Sandwich theorem. Cauchy's first and second theorems on limits, Monotonic sequences, Monotone convergence theorem.

Module 2

Infinite Series: Definition, positive term series, tests for convergence -comparison test, Cauchy's root test, D'Alembert's ratio test, Raabe's test, logarithmic test, alternating series, Leibnitz test for the convergence of alternating series, absolute convergence and conditional convergence.

Module 3

Functions of a Single Variable-1: Limits of a function, continuous functions, continuity at a point, continuity in an interval, discontinuous functions, types of discontinuity, functions continuous on closed intervals, uniform continuity.

Module 4

Functions of a Single Variable-2: Derivatives, derivability at a point, derivability in an interval, Darboux's theorem(without proof), intermediate value theorem for derivatives, Rolle's Theorem, Lagrange's Mean Value Theorem, Cauchy's Mean value theorem, Uniform convergence of sequences and series of functions, tests for uniform convergence of sequence and series of functions. Riemann Integration.

Book of Study

1. Malik, S.C. and Arora, S. (2014). Mathematical Analysis, Fourth Edition, New Age International limited, New Delhi.

References

1. Bali, N.P (2009), Real Analysis, Laxmi Publications (P) Ltd, New Delhi.
2. Shanti Narayan and Raisinghansia, M.D (2014). Elements of Real Analysis (17th ed.), S. Chand & Company, New Delhi.
3. Apostol, T.M (2002). Mathematical Analysis, (2nd ed.), Narosa Publishing House, New Delhi.
4. Rudin W. (2013). Principles of Mathematical Analysis, (3rd ed.), TMH.

VDAMSC103- Descriptive Statistics-I

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Introduction to Statistics: Introduction to Statistics, concepts of a statistical population and sample, Data types- qualitative and quantitative, discrete and continuous, primary and secondary. Different types of scale- nominal and ordinal, ratio and interval. Collection of data-census and sampling, sampling techniques- SRS, systematic, stratified and cluster (description only), schedule and questionnaire. Data collection: direct, using third parties, sending questionnaire, by mail/telephone, Classification and tabulation - One-way and two-way classified data, Preparation of frequency distribution, relative frequency and cumulative frequency distributions. Stem-and-leaf chart, Histogram, Frequency polygon, Frequency curve and Ogives.

Module 2

Descriptive Measures: Averages- Arithmetic Mean, Median, Mode, Geometric Mean, Harmonic Mean and Weighted averages. Quantiles- quartiles, deciles, percentiles. Absolute and relative measures dispersion - Range, Quartile Deviation, Mean Deviation and Standard Deviation, Co-efficient of variation, Box plot, Raw moments, central moments and their inter relation, skewness- Pearson's, Bowley's and moment measures of skewness, Kurtosis- percentile and moment measure of kurtosis.

Module 3

Probability & Random Variables: Random experiments-Algebra of events- Mutually exclusive, equally likely and Independent events. Classical, Frequency and Axiomatic approaches to probability. Monotone property, Addition theorem (up to 3 events), Boole's inequality (finite case), and other simple properties. Conditional probability. Multiplication theorem (up to 3 events). Independence of events. Total probability law. Bayes' theorem. Concept of random variables- discrete and continuous random variables. Probability mass and density functions, and distribution functions. Evaluation of conditional and unconditional probabilities. Change of variables- methods of jacobian and distribution function (one variable case). Concept of a two-component random vector, bivariate probability mass and density functions. Marginal and conditional distributions. Independence of bivariate random variables. Bivariate data- types of correlation, scatter diagram, Karl Pearson's product- moment and Spearman's rank correlation coefficients.

Module 4

Mathematical Expectation: Expectation of random variables and their functions. Definition of - Raw moments, central moments and their inter-relation, covariance, Pearson's correlation coefficient in terms of expectation. MGF and simple properties. Moments from mgf. conditional mean and variance.

Book of Study

1. S C Gupta and V K Kapoor; Fundamentals of Mathematical Statistics; Sultan Chand and Sons New Delhi

References

1. S P Gupta; Statistical Methods; Sultan Chand and Sons New Delhi
2. M R Spiegel Theory and Problems of Statistics Schaum's Outline Series.

VDAMSC104-Introduction to Python Programming

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Introduction to programming: Designing a program: development cycle, pseudo code, flowcharts and algorithm development; variables, numerical data types and literals, strings, assignment and reassignment, input/output, formatted output, reading numbers and strings from keyboard; performing calculations: floating point and integer division, converting math formulas to programming statements, standard mathematical functions, mixed-type expressions and data type conversions.

Module 2

Program Decision and Control Structures: Boolean expressions, relational expressions, logical operators, Boolean variables; if, if-else, if-elif-else, inline-if statements, nested structures, and flowcharts; use of temporary variables, application: arranging a few numbers in increasing or non-decreasing, decreasing or non-increasing orders, etc.

Module 3

Repeated calculations and Looping: condition-controlled and count-controlled loops, while loop (condition-controlled), infinite loops; for-loop (count-controlled), applications: calculating summation of series, Taylor expansion of mathematical functions, etc; nested loops.

Module 4

Arrays, Lists and Tuples: lists, index, iterating over a list with for-loop, operations with lists, built-in functions, finding index, sorting, etc., processing lists; Arrays: vectors and tuples, vector arithmetic, arrays, Numerical Python arrays – Numpy, curve plotting: matplotlib, SciTools, making animations and videos; Higher-dimensional arrays: two- and three-dimensional arrays, matrix objects and matrix operations: inverse, determinant, solving linear systems using standard libraries.

Book of Study

1. Tony Gaddis, Starting Out with Python, 3E, Pearson, 2015. Book contains flowcharting and pedagogical program development in an introductory Python book. Ch.1 to 5, Ch.7.

References

1. Hans Petter Langtangen, A Primer on Scientific Programming with Python, 5E, Springer, 2016. Ch. 1 to 3, Ch. 4 (carefully selected material appropriate for first year students)
2. VanderPlas, J. (2016). Python data science handbook: Essential tools for working with data. "O'Reilly Media, Inc."
3. Guido van Rossum and Fred L. Drake Jr, —An Introduction to Python - Revised and updated for Python 3.2, Network Theory Ltd., 2011.

VDAMSC105- Office Automation Packages

CREDITS: 3

TOTAL LECTURE HOURS: 3 HOURS/WEEK

Module 1

Word Package Basics: Introduction to word, work with text, format documents, work with text objects, work with references, change the page layout, background and borders. insert headers and footers, insert and edit tables, insert clip art and pictures to documents, perform a mail merge, work with references, work with illustrations, specialized documents, collaborate with others, web pages.

Module 2

Introduction to Spreadsheet Package: Introduction Excel user interface, working with cell and cell addresses, selecting a range, moving, cutting, copying, pasting, inserting and deleting cells, freezing cells, adding deleting copying worksheet within a workbook, renaming a worksheet. Cell formatting options, formatting fonts, aligning, wrapping and rotating text, using borders boxes and colours, centering a heading, changing row /columns height/width, formatting a worksheet automatically, insert comments, clear contents in a cell. Using print preview, margin and orientation, centering a worksheet, using headers and footers.

Module 3

Advanced features of spreadsheet package: All functions in Excel, using logical functions, statistical functions, mathematical. Elements of Excel charts, categories, creative chart, choosing chart type, edit chart access-titles, labels, data series and legend, adding a text box, rotate text in a chart, saving a chart.

Module 4

Presentation Package: MS Powerpoint- Advantages of presentation screen layout, creating presentation inserting slides, adding sounds and video formatting slides, slide layout views in presentation-slide transition, custom animatio,n managing slide shows-using pen setting slide intervals.

Book of Study

1. Antony Thomas, Information Technology for Office, Pratibha Publications.

References

1. Gini Courter and Annette Marquis, MS Office 2007; BPB Publications.
2. George W. Gloeckner, Nancy L. Leech, Gene W. Gloeckner, Karen C. Barret, IBM SPSS for Introductory Statistics: Use and Interpretation (4th Ed.).

Semester II

VGENCC201- Reading Skills

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Recap of language skills: vocabulary, phrase, clause, sentences

Module 2

Fluency building: word match, reading aloud, recognition of attributes, parts of speech in listening and reading, listening –reading comprehension.

Module 3

Principles of communication: communication coding and decoding-signs and symbols-verbal and non-verbal symbols-language and communication; language vs. communication-media/channels for communication.

Module 4

Types of communication: functional, situational, verbal and non-verbal, interpersonal, group, interactive, public, mass line, dyadic-with illustrations.

Book of Study

1. Monippally, Matthukkutty M , Business communication strategies, Tata McGraw Hill Publications, New Delhi

References

1. Sasikumar V and P V Dhamija, Spoken English: A Self-learning Guide to Conversation Practice, Tata McGraw Hill Publications New Delhi
2. Hewings, Martin, Advance English Grammar: A Self Study Reference and Practice Book for South Asian Students Cambridge University

VDAMGC201-Statistical Distributions

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Discrete Distributions: Degenerate, Uniform, Bernoulli, Binomial, Hyper geometric, Negative binomial, Geometric, Poisson - mean, variance, m.g.f, their properties-fitting of Binomial and Poisson, memory less property of Geometric distribution, multinomial distributions and its applications.

Module 2

Continuous Distributions: Uniform, Beta two types, Exponential, Gamma, Cauchy, Pareto, and Laplace - mean, variance, m.g.f, characteristic function, their properties - memory less property of exponential distribution.

Module 3

Normal and Lognormal Distributions: Properties, fitting of normal distribution, linear combination of normal variates, use of standard normal tables for various probability computation. Bivariate normal-marginal and conditional distributions.

Module 4

Sampling Distributions: Concept of sampling distributions, Statistic(s) and standard error(s). Mean and variance of sample mean when sampling is from a finite population. Sampling distribution of mean and variance from normal distribution. Chi-square, t, F distributions and statistics following these distributions. Relation among Normal, Chi-square, t and F distributions. (Problems based on these topics)

Book of Study

1. Gupta, S.C. and Kapoor, V.K. (2014). Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.

References

1. Hogg, R.V., McKean, J.W. and Craig, A.T. (2014). Introduction to Mathematical Statistics (7th ed.), Pearson Education Publication.
2. Johnson N.L, Kotz S. & Kemp A.W (1992). Univariate Discrete Distributions, John Wiley.
3. Rohatgi V.K (1988). An Introduction to Probability Theory and Mathematical Statistics, Willey Eastern.

VDAMGC202- Linear Algebra-I

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Matrices: Operations on Matrices-Addition, Multiplication, Transpose, Special types of Matrices. Systems of linear equations.

Module 2

Elementary operations: Gaussian elimination and row operations, Echelon form of a matrix, Elementary matrices and rank of a matrix, Existence of solution of $AX=B$.

Module 3

Matrix Algebra: Properties of determinants, Cofactor expansion, Inverse of a matrix.

Module 4

Eigen values and Eigenvectors: Properties and evaluation of eigen values and vectors, eigen values and vectors of special types of matrices.

Book of Study

1. Gilbert Strang, Linear Algebra and its Applications, Cengage.

References

1. H. Anton, C. Rorres, Elementary Linear Algebra, Wiley.
2. Derek Robinson, A Course in Linear Algebra with Applications, Allied publishers.
3. Agarwal, R. P., & Flaut, E. C. (2017). An introduction to linear algebra. Chapman and Hall/CRC.
4. Strang, G. (2007). Linear Algebra and Its Applications. Cengage learning.

VDAMSC203-Introduction to R Programming

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Basics of R: Installing the base R system and R-Studio. How to run R, R Sessions and Functions, Basic Math, Variables, Data Types, Vectors, Advanced Data Structures, Data Frames, Lists, Matrices, Arrays, Classes.

Module 2

Packages in R: Installing and loading packages, Familiarizing with popular packages and functions in R, Writing functions in R.

Module 3

R Programming Structures: Control Statements, Loops, - Looping Over Non vector Sets,- If-Else, Arithmetic and Boolean Operators and values, Default Values for Argument, Return Values, Deciding Whether to explicitly call return- Returning Complex Objects.

Module 4

Exploratory data analysis in R: Exploring categorical data, Exploring numerical data, Numerical summaries, case studies.

Book of Study

1. Sudha G. Puroohit, Sharad D. Lore, Shailaja r. Deshmukh. Statistics using R (2nd Ed.). Narosa Publishing House.

References

1. Crawley, Michael J. The R book. John Wiley & Sons, 2012.
2. Peng, Roger D. R programming for data science. Leanpub, 2016.

VDAMSC204-Statistical Inference

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Point Estimation: Concepts of Estimation, Estimators and Estimates. Point and interval estimation. Properties of good estimators- unbiasedness, efficiency, consistency and sufficiency. Factorization theorem (statement). (Problems based on these topics).

Module 2

Methods of Estimation, Interval Estimation: Methods of moments, maximum likelihood. Invariance property of ML Estimators (without proof). Minimum variance. Cramer-Rao inequality (without proof). $100(1-\alpha)$ % confidence intervals for mean, variance, proportion, difference of means and proportions and variances (problems based on these topics).

Module 3

Testing of Hypotheses: Statistical hypotheses, null and alternate hypotheses, simple and composite hypotheses, type-I and type-II errors. Critical Region. Size and power of a test, p-value, Neyman-Pearson approach. Large sample tests - Z-tests for means, difference of means, proportion and difference of proportion, chi-square tests for independence, homogeneity and goodness of fit. Normal tests for mean, difference of means and proportion (when σ known), t-tests for mean and difference of means (when σ unknown), t-test for $r = 0$, paired t-test, test for proportion (binomial), chi-square test, F-test for ratio of variances. ANOVA

Module 4

Non-Parametric Tests: Introduction to Non parametric tests, non parametric equivalent of parametric tests.

Book of Study

1. Rohatgi V.K. An Introduction Probability Theory and Mathematical Statistics, John Wiley and Sons

References

1. Gupta S. C. and Kapoor V. K.(2002). Fundamentals of Mathematical Statistics, 11th edition, Sultan Chand and Sons.
2. George Casella, Roger L. Berger. Statistical Inference (2nd Ed).
3. Goon A. M., Gupta M. K., and Dasgupta B.(2005). Fundamentals of Statistics, Vol.I, 8th edition, World Press, Kolkatta.
4. Gibbons J.K (1971). Non Parametric Statistical Inference, McGraw Hill.

VDAMSC205- Introduction to DBMS

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Introduction to Databases: Database Environment, The Relational Model and Languages: The Relational Model, Relational Algebra and Relational Calculus, QBE, Database Design: ER diagrams and their transformation to relational design, Normalization, Security, Transaction Management: Transaction Support, Concurrency Control, Database Recovery.

Module 2

Languages: Data Definition Language (DDL), Data Manipulation Language (DML), Data Control Language (DCL) commands, Database objects like – Views, indexes, sequences, Synonyms and data dictionary, SQL.

Module 3

Object Oriented Database Management Systems: Concepts, Composite objects, Integration with RDBMS applications, Issues in OODBMSs, Advantages and Disadvantages of OODBMSs

Module 4

Object-Oriented Database Design: Decision making processes, evaluation of DSS, Group decision support system. Distributed Databases

Book of Study

1. Silberschatz, A., Korth, H. F., & Sudarshan, S. (1997). *Database System Concepts* (Vol. 4). New York: McGraw-Hill.

References

1. Raghurama Krishnan, Johannes Gehrke, TATA McGraw Hill (3rd Ed.), 2003.
2. Database Administration: The Complete Guide to DBA Practices and Procedures by Craig S. Mullins
3. MySQL Database Usage & Administration by Vikram Vaswani
4. Pratt, P. J. & Adamski, J. J. (2011). Database Systems: Management and Design. Boyd & Fraser Pub. Co.
5. James R Groff and Paul N Weinberg (2003) The Complete Reference SQL –, Second Edition, Tata McGraw Hill.
6. Elmasri, R. & Navathe, S. (2010). Fundamentals of Database Systems. Addison-Wesley Publishing Company.

Semester III

VGENCC301- Writing and Presentation Skills

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Writing as a skill: its importance – mechanism of writing – words and sentences – paragraph as a unit of structuring a whole text – combining different sources – functional use of writing – personal, academic and business writing – creative use of writing.

Module 2

Writing process: planning a text – finding materials - drafting – revising – editing - finalizing the draft - computer as an aid – key board skills - word processing - desk top publishing.

Module 3

Writing models: essay - précis - expansion of ideas – dialogue - letter writing – personal letters formal letters - CV – surveys – questionnaire - e-mail – fax - job application – report writing.

Module 4

Presentation as a skill: elements of presentation strategies – audience – objectives – medium– key ideas -structuring the material - organizing content - audio-visual aids – hand outs – use of power point - clarity of presentation - non-verbal communication - seminar paper presentation and discussion.

Book of Study

1. English for Effective Communication. Oxford University Press, 2013.

References

1. Robert, Barraas. Students Must Write. London: Routledge, 2006.
2. Bailey, Stephen. Academic Writing. Routledge, 2006.

VDAMGC301-Enterprise Resource Planning

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

ERP: Evolution of ERP, MRP and MRP 2, difference between integrated and traditional information system, early and new ERP packages, ERP products and markets, benefits of ERP system implementation, critical success rate.

Module 2

Selection and Implementation: opportunity and problems in ERP selection and implementation, ERP implementation, identifying ERP benefits, emergence of reengineering, concepts of business process-identifying reengineering need, preparing for reengineering implementing change-change management-integrating with other systems

Module 3

Modules of ERP: business modules of ERP package, salient features of each module comparison of ERP package, business process modeling, gap analysis, emerging trends in business process, selection of ERP process for implementation.

Module 4

Technical Architecture of ERP system: communication and networking facilities, client service system, concepts of business objects, distributed object, computing architecture, support for data mining and warehousing, EDI-internet and related technologies.-net technologies. ERP and supply chain management-extending scope of ERP through SCM, the concept of value chain differentiation between ERP and SCM, issues in selection and implementation of SCM solutions-E-Business and ERP, security and privacy issues-recent development-future growth of ERP –role of ERP international business

Book of Study

1. Jyotindra Zaveri, Enterprise Resource Planning.

References

1. Ptak, Carol A. and Eli Schragenheim, Enterprise Systems for Management, St. Luice Press, New York

VDAMGC302-Linear Algebra II

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Vector Spaces: Vector spaces, subspaces, span and linear independence, basis and dimension, row and column space of a matrix, change of basis.

Module 2

Linear transformations: Linear transformations, range space and rank, null space and nullity, matrix representation, isomorphism.

Module 3

Generalized inverse: Generalized inverse computation, Moore – penrose g- inverse, g-inverse of full rank.

Module 4

Quadratic Forms: Quadratic forms, definiteness of QF.

Book of Study

1. H. Anton, C. Rorres, Elementary Linear Algebra, Wiley.

References

1. K. Hoffman and R. Kunze, Linear Algebra, Prentice Hall.
2. Sheldon Axler, Linear Algebra Done Right, 2nd Edition, Springer.
3. Agarwal, R. P., & Flaut, E. C. (2017). An introduction to linear algebra. Chapman and Hall/CRC.
4. Strang, G (2007). Linear Algebra and Its Applications. Cengage learning.

VDAMSC303-Advanced Python Programming

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Intermediate Python: Matplotlib, Dictionaries and Pandas, Logic, Control flow and filtering

Module 2

Importing data in Python: Importing from flat files such as .txts and .csvs, from files native to other software such as Excel spreadsheets, Stata, SAS and MATLAB files, from relational databases such as SQLite & PostgreSQL, from the web and from Application Programming Interfaces, also known as APIs

Module 3

Cleaning data in Python: Exploring data, tidying data for analysis, combining data for analysis, cleaning data for analysis, case studies. Manipulating dataframes with pandas-Extracting and transforming data, advanced indexing, rearranging and reshaping data, grouping data.

Module 4

Exploratory data analysis in Python: Graphical exploratory analysis, numerical exploratory analysis

Book of Study

1. VanderPlas, Jake. Python data science handbook: essential tools for working with data. "O'Reilly Media, Inc.", 2016.

References

1. Grus, Joel. Data science from scratch: first principles with python. O'Reilly Media, 2019.
2. Gaddis, T., & Agarwal, R. (2015). Starting out with Python. Pearson.
3. Guido van Rossum and Fred L. Drake Jr, —An Introduction to Python - Revised and updated for Python 3.2, Network Theory Ltd., 2011.
4. John V Guttag, —Introduction to Computation and Programming Using Python, Revised and expanded Edition, MIT Press , 2013

VDAMSC304-Advanced R Programming

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Importing data in R: Importing data from flat files with utils, readr& data.table, importing Excel data, Reproducible Excel work with XLConnect, Importing data from database files, Importing data from web, Importing data from statistical software packages.

Module 2

Basics of Data Manipulation in R: Cleaning data in R: Introduction and exploring raw data, tidying data, preparing data for analysis, case studies

Module 3

Data Manipulation with dplyr package: select, mutate, filter, arrange and summarise verbs, the pipe operator, joining data sets with dplyr: mutating joins, filtering joins and set operations, assembling data, advanced joining, case studies

Module 4

Data visualization with ggplot2: Introduction, The grammar of graphics philosophy, different layers in ggplot, data, aesthetics, and geometries layers.

Book of Study

1. Crawley, Michael J. The R book. John Wiley & Sons, 2012.

References

1. Wickham, Hadley, and Garrett Golemund. R for data science: import, tidy, transform, visualize, and model data. "O'Reilly Media, Inc.", 2016.
2. Peng, Roger D. R programming for data science. Leanpub, 2016.
3. Sudha G. Puroohit, Sharad D. Lore, Shailaja r. Deshmukh. Statistics using R (2nd Ed.). Narosa Publishing House.

VDAMSC305-Multivariate Analysis

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Bivariate normal distribution: marginal and conditional distributions, Multinomial distribution. Multivariate normal - marginal and conditional distributions, properties and characterizations, estimation of mean and dispersion matrix. Independence of sample mean and sample dispersion matrix

Module 2

Multivariate testing: Likelihood ratio test, Hotelling's T² (one and two samples), Mahalanobi's D² statistic, Fisher-Behren problem, MANOVA (one way and two-way)

Module 3

Multivariate tools: Dimension reduction methods, principal components, canonical correlation, profile analysis, factor analysis.

Module 4

Classification problem, discriminant analysis, Bayes' procedures, Fisher's approach, more than two groups, selection of variables. Testing independence of sets of variates, tests for equality of dispersion matrices, sphericity test. Cluster analysis, proximity data, hierarchical clustering, and non-hierarchical clustering methods.

Book of Study

1. Anderson T. W. (1984). An Introduction to Multivariate Statistical Analysis (2nd Ed.) John Wiley.

References

1. Johnson R.A. and Wichern D.W. (1990) Applied Multivariate Statistical Analysis. Pearson education.
2. Giri N (1984). Multivariate Observation, John Wiley.

Semester IV

VGENCC401- Soft Skill and Personality Development

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module – 1

Personal Skills: Knowing oneself- confidence building- defining strengths- thinking creatively- personal values-time and stress management.

Module – 2

Social Skills: Appropriate and contextual use of language- non-verbal communication- interpersonal skills- problem solving.

Module – 3

Personality Development: Personal grooming and business etiquettes, corporate etiquette, social etiquette and telephone etiquette, role play and body language.

Module – 4

Presentation skills: Group discussion- mock Group Discussion using video recording – public speaking.

Module – 5

Professional skills: Organisational skills- team work- business and technical correspondence-job oriented skills-professional etiquettes.

Book of Study

1. Matila Treece: Successful communication: Allyun and Bacon Pubharkat. Jon Lisa Interatid skills in Tourist Travel Industry Longman Group Ltd.

References

1. Robert T. Reilly – Effective communication in tourist travel Industry Dilnas Publication.
2. Boves. Thill Business Communication Today Mcycans Hills Publication.
3. Dark Studying International Communication Sage Publication.
4. Murphy Hidderandt Thomas Effective Business Communication Mc Graw Hill.

VDAMGC401- Business Ethics

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Introduction-Concept, relevance and importance, Ethical principles and relevance in business, Normative and Justice & Fairness.

Module 2

Ethics and the organization. Organizational ethics, basic elements of an ethical organization, designing of code of ethics of an organization, dimensions of organizational ethics, benefits of managing ethics in the organization, current ethical related issues in organizations.

Module 3

Environmental Ethics Sustainable Development, Industrial Pollution & Environmental Issues.

Module 4

Corporate Governance Introduction to corporate governance, Importance, Issues and Obligations.
Consumer Protection Consumer & Consumer protection and Legal Protection to consumers.

Book of Study

1. Business Ethics Concepts & Cases, Velasquez, TMH Publication

References

1. Modern Business Environment, ABPL Publications

VDAMGC402-Fuzzy Mathematics

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Fuzzy Sets: Introduction, Crisp sets: An overview, Fuzzy sets: Basic types, Basic concepts. Additional properties of α cuts, Representation of fuzzy sets, Extension principle of fuzzy sets.

Module 2

Operations on Fuzzy Sets: Types of Operations, Fuzzy complements, Fuzzy intersections: t-norm, Fuzzy unions: t-conorms, Combinations of operations.

Module 3

Fuzzy Arithmetic: Fuzzy Numbers, Arithmetic and operations on intervals, Arithmetic operations on Fuzzy numbers.

Module 4

Fuzzy Logic: Classical logic: an overview, Multi valued logics, Fuzzy propositions, Fuzzy quantifiers, Linguistic hedges, Inference from conditional fuzzy propositions.

Book of Study

1. George J Klir and Bo Yuan, Fuzzy Sets and Fuzzy Logic: Theory and Applications, Prentice Hall NJ,1995.

References

1. H.J. Zimmermann, Fuzzy Set Theory and its Applications, Allied Publishers, New Delhi, 1991.
2. Kevin M Passino and Stephen Yurkovich, Fuzzy Control, Addison Wesley Longman, 1998.
3. Klir G.J and T. Folger, Fuzzy Sets: Uncertainty and information, Prentice Hall of India, Pvt Ld, New Delhi (1998)

VDAMSC403-Sampling & Design of Experiments

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Sampling 1: Census and sampling methods, probability sampling and non-probability sampling, principal steps in sample surveys, sampling errors and non-sampling errors, bias, variance and mean square error of an estimator, simple random sampling with and without replacement, estimation of the population mean, total and proportions, properties of the estimators, variance and standard error of the estimators, confidence intervals, determination of the sample size.

Module 2

Sampling 2: Stratified random sampling, estimation of the population mean, total and proportion, properties of estimators, various methods of allocation of a sample, comparison of the precisions of estimators under proportional allocation, optimum allocation and srs. Systematic sampling – Linear and Circular, estimation of the mean and its variance. Comparison of systematic sampling, srs and stratified random sampling for a population with a linear trend.

Module 3

Linear estimation: standard Gauss Markoff set up, estimability of parameters, method of least squares, best linear unbiased Estimators, Gauss – Mark off Theorem, tests of linear hypotheses. Planning of

experiments, Basic principles of experimental design, uniformity trials, analysis of variance, one-way, two-way and three-way classification models, completely randomized design (CRD), randomized block design (RBD) latin square design (LSD) and Graeco-latin square designs, Analysis of covariance (ANCOVA), ANCOVA with one concomitant variable in CRD and RBD.

Module 4

Incomplete block design: balanced incomplete block design (BIBD); incidence Matrix, parametric relation; intrablock analysis of BIBD, basic ideas of partially balanced incomplete block design (PBIBD). Factorial experiments, 2^n and 3^n factorial experiments, analysis of 2^2 , 2^3 and 3^2 factorial experiments, Yates procedure, confounding in factorial experiments, basic ideas of response surface designs.

Book of Study

1. Das M.N. and Giri N.C. (1994) Design and analysis of experiments, Wiley Eastern Ltd.
2. Cochran W. G. (1999) Sampling Techniques, 3rd edition, John Wiley and Sons.

References

1. Mukhopadhyay P. (2009) Theory and Methods of Survey Sampling, 2nd edition, PHL, New Delhi.
2. Aloke Dey (1986) Theory of Block Designs, Wiley Eastern, New Delhi.
3. Montgomery C.D (1976). Design and Analysis of Experiments, John Wiley New York.
4. Des Raj (1967)- Sampling Theory, Tata McGraw Hill, New Delhi

VDAMSC404-Time Series Analysis

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Basics of Time series: components of time series, additive and multiplicative models, determination of trend, analysis of seasonal fluctuations, test for trend and seasonality, exponential and moving average smoothing, holt-winter smoothing, forecasting based on smoothing.

Module 2

Time series as a discrete parameter stochastic process: auto covariance and auto correlation functions and their properties, stationary processes, test for stationarity, unit root test, stationary processes in the frequency domain, spectral analysis of time series.

Module 3

Detailed study of the stationary processes: moving average (MA), autoregressive (AR), autoregressive moving average (ARMA) and autoregressive integrated moving average (ARIMA) models.

Module 4

Estimation of ARMA models: maximum likelihood method (the likelihood function for a Gaussian AR(1) and a Gaussian MA(1) and Least squares, Yule-Walker estimation for AR Processes, choice of AR and MA periods, forecasting, residual analysis and diagnostic checking.

Book of Study

1. Chatfield C. (2004) The Analysis of Time Series - An Introduction (Sixth edition), Chapman and Hall.

References

1. Abraham B. and Ledolter J.C. (1983) Statistical Methods for Forecasting, Wiley.
2. Montgomery D. C., Cheryl L. J., and Murat K. (2015) Introduction to Time Series Analysis and Forecasting. John Wiley & Sons.
3. Brockwell P.J and Davis R.A. (2002) Introduction to Time Series and Forecasting Second edition, Springer-Verlag.

VDAMSC405-Machine Learning I

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Techniques of Machine Learning: Supervised learning, Unsupervised learning, Semi supervised learning, Reinforcement learning, Machine Learning Algorithm, Application of machine learning. Capacity, Overfitting and underfitting, Hyper parameters, Estimator, Bias and Variance, Maximum likelihood estimation, Stochastic Gradient descent

Module 2

Resampling methods: Cross validation and the bootstrap, Linear model selection and Regularization: Subset selection, Shrinkage methods, Dimension reduction methods, Considerations in high dimensions.

Module 3

Feature Engineering: Feature Improvement: Dealing with missing data, Standardization & normalization; Feature Selection: Statistics based feature selection, model based feature selection; Feature transformation: Principal Component Analysis, linear discriminant analysis; Feature Learning.

Module 4

Introduction, Simple Linear regression, multiple linear regression, Extensions of the linear model, Classification: overview, Logistic regression, linear discriminant analysis, comparison of classification methods.

Book of Study

1. G. James, R. Tibshirani, An Introduction to Statistical Learning: with applications in R, Springer.

References

1. T. Hastie, R. Tibshirani, Elements of Statistical Learning: Data mining, Inference and Prediction, Springer.
2. Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press.
3. Ethem, A.(2004).Introduction to Machine Learning (Adaptive Computation and Machine Learning Series). The MIT Press.

Semester V

VGENCC501-Environmental studies

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Multidisciplinary nature of environmental studies Definition, scope and importance-Need for public awareness. Natural Resources : Renewable and non-renewable resources : Natural resources and associated problems. Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

Module 2

Ecosystems Concept of an ecosystem-Structure and function of an ecosystem-Producers, consumers and decomposers-Energy flow in the ecosystem-Ecological succession-Food chains, food webs and ecological pyramids-Introduction, types, characteristic features, structure and function of the following

ecosystem : Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) Biodiversity and its conservation Introduction – Definition : genetic, species and ecosystem diversity, Biogeographically classification of India, Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values, Biodiversity at global, National and local levels, India as a mega-diversity nation Hot-spots of biodiversity, Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts., Endangered and endemic species of India, Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

Module 3

Environmental Pollution Definition, Cause, effects and control measures of: - Air pollution- Water pollution-Soil pollution Marine pollution-Noise pollution-Thermal pollution-Nuclear hazards Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution, Pollution case studies, Disaster management: floods, earthquake, cyclone and landslides. Human Population and the Environment Population growth, variation among nations-Population explosion – Family Welfare Programme- Environment and human health-Human Rights-Value Education- HIV/AIDS-Women and Child Welfare- Role of Information Technology in Environment and human health-Case Studies.

Module 4

Social Issues and the Environment from Unsustainable to Sustainable development-Urban problems related to energy-Water conservation, rain water harvesting, watershed management- Resettlement and rehabilitation of people; its problems and concerns-Case Studies Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust-Case Studies. Wasteland reclamation- Consumerism and waste products-Environment Protection Act-Air (Prevention and Control of Pollution) Act-Water (Prevention and control of Pollution) Act-Wildlife Protection Act-Forest Conservation Act-Issues involved in enforcement of environmental legislation-Public awareness

Book of Study

Textbook for Environmental Studies for Undergraduate Courses of all Branches of Higher Education.

Further Activities

- Field work
- Visit to a local area to document environmental assets river/forest/grassland/hill/mountain
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural
- Study of common plants, insects, birds.
- Study of simple ecosystems-pond, river, hill slopes, etc. (Field work Equal to 5 lecture hours)

VDAMGC501- Business Informatics

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

History of e-commerce, definition, classification- B2B, B2C, C2C, G2C, B2G sites, ecommerce in education, financial, auction, news, entertainment sectors, Doing e-Commerce.

Module 2

Electronic payment systems – relevance of currencies, credit cards, debit cards, smart cards, e-credit accounts, e-money, security concerns in e commerce, authenticity, privacy, integrity, non-repudiation, encryption, secret key cryptography, public key cryptography, digital signatures, firewalls.

Module 3

Mass marketing, segmentation, one-to-one marketing, personalization and behavioural marketing, web advertising, online advertising methods, advertising strategies and promotions, special advertising and implementation topics.

Module 4

Mobile Commerce: attributes and benefits, Mobile Devices, Computing software, Wireless Telecommunication devices, Mobile finance applications, Web 2.0 Revolution, social media and industry disruptors, Virtual communities, Online social networking: Basics and examples, Web 3.0 and Web 4.0, Civil law, intellectual property law, common law and EC legal issues

Book of Study

1. Erfan Turban et.al., Electronic Commerce—A Managerial Perspective, Pearson Education

References

2. R Kalokota, Andrew V. Winston, Electronic Commerce – a Manger’s guide, Pearson

VDAMGC502- Operations Research-I & Numerical Methods

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Linear programming: Introduction to linear programming problems (LPP), graphical solution, solutions to an LPP, simplex method.

Module 2

Artificial variables: two-phase simplex method, big-M method, dual of linear programming, theorems of duality, dual-simplex method.

Module 3

Solution to algebraic and transcendental equations:- Bisection Method, Iteration method, Regula -falsi method, Newton-Raphson method. Solution to Simultaneous linear equations:- Gauss elimination method, Gauss-Jordan methods, Jacobi’s method, Gauss-Seidel method, solution to non-linear equations – Newton Raphson method.

Module 4

Interpolation - Newtons forward interpolation formula, Lagrange’s interpolation formula, Numerical integration- General Quadrature formula, Newton-Cotes formula, Trapeizoidal, Simpson’s (1/3), Simpson’s (3/8) and Weddle’s formula.

Book of Study

1. Sastry S.S. (1998) Introductory methods of numerical analysis. Third edition, Printice Hall, New Delhi.

2. Kanti Swarup, Gupta, Manmohan (2004) 10th edition, Operations Research – Principles and Practice.

References

1. Mohanan J.F (2001) Numerical methods of statistics, Cambridge University Press.
2. Srimanta Pal (2009) Numerical Methods- Principles, Analysis and Algorithms. Oxford University Press.
3. Gupta R.K (2010): Operations Research, Krishna Prakashan Media (P) Ltd., Meerut.
4. Taha H.A (2014). Operations Research, Pearson Education Publication.

VDAMSC503- Machine Learning II

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Polynomial regression, step functions, basis functions, regression splines, smoothing splines, Local regression, generalised additive models for regression and classification problems.

Module 2

Introduction to Decision Trees. Regression trees, Classification trees, comparison of trees and linear models, Bagging, Random Forests, and Boosting.

Module 3

Support Vector Machines: Hyperplane, Maximum Margin Classifier, Support Vector Classifiers, Support Vector Machines, One vs One Classification and One vs All Classification, Relationship to Logistic Regression. Unsupervised Learning: Principal Component Analysis and its applications, K-Means Clustering and Hierarchical Clustering.

Module 4

Neural Networks: Introduction, Projection Pursuit Regression, Neural Networks, Fitting Neural Networks, Some issues in Training Neural Networks-Starting Values, Overfitting, Scaling of the Inputs, Number of Hidden Units and Layers, Multiple Minima. Optimization, Challenges in neural network optimization, Parameter initialization strategy, Adaptive learning rates, Optimization algorithms

Book of Study

1. G. James, R. Tibshirani, An Introduction to Statistical Learning: with applications, New York: Springer.
2. Tom M. Michell. Machine Learning, MGH

References

1. T. Hastie, R. Tibshirani, Elements of Statistical Learning: Data mining, Inference and Prediction, Springer.
2. Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press.
3. Ian Goodfellow, Yoshua Bengio and Aaron Courville, Deep Learning, MIT Press. (Chapters 5-10)
4. Murphy, K. P. (2012). Machine learning: a probabilistic perspective. MIT press.
5. Alpaydin (2014) Introduction to Machine Learning, 3rd Edition, MIT Press.
6. Frank Kane (2012) Data Science and Machine Learning. Manning Publications.

VDAMSC504- Data Mining

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Data mining: Meaning, Definition, Goals, Scope, Related technologies, Stages involved in data mining, Data mining techniques , Major issues in data mining, Applications.

Module 2

Data objects and attribute types attribute generalization and relevance, Class comparison, Statistical measures, Data visualization, Measures of similarity and dissimilarity; Data preprocessing: Overview, Data cleaning, Data integration, Data reduction, Data transformation, Discretization, Generating concept hierarchies.

Module 3

Mining frequent patterns, associations and correlations: Basic concepts and methods, Frequent itemset mining methods -Apriori algorithm, Pattern growth approach, Framing association rules, Pattern evaluation methods, Pattern mining concepts, Mining in multi level and multidimensional space, Constraint based frequent pattern mining.

Module 4

Text mining, Web mining, Spatial mining, Illustration of mining real data, Pre-processing data from a real domain, applying various data mining techniques to create a comprehensive and accurate model of the data clustering.

Book of Study

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar , Introduction to Data Mining, Pearson Education Inc , 2003
2. Jiawei Han and Micheline Kamber, "Data Mining - Concepts and Techniques" (Second Edition), Elsevier, 2006

References

1. Alex Berson and Stephen J. Smith, *Data Warehousing, Data Mining & OLAP, Computing* McGraw-Hill, Tata McGraw-Hill Education, 2004
2. K.P. Soman, Shyam Diwakar and V. Ajay, *Insight into Data mining Theory and Practice*, Prentice Hall of India, 1st Edition
3. Borgelt, C., Steinbrecher, M., & Kruse, R. R. (2009). *Graphical models: representations for learning, reasoning and data mining*. John Wiley & Sons.
4. T. Hastie, R. Tibshirani and J. Friedman (2016) *The Elements of Statistical Learning: Data Mining, Inference and Prediction*, Springer, 2nd Edition, 2009.

Semester VI

VGENCC601- Entrepreneurship Development Program

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

To make the students understand about entrepreneurs and different classifications. Entrepreneur and entrepreneurship - Definition; traits and features; classification; Entrepreneurs; Women entrepreneurs; Role of entrepreneur in Entrepreneurs in India.

Module 2

Create an awareness about EDP. Entrepreneurial development programme concept; Need for training; phases of EDP; curriculum & contents of Training Programme; Support systems, Target Groups; Institutions conducting EDPs in India and Kerala.

Module 3

General awareness about identification of project financing new enterprises. Promotion of a venture; opportunity Analysis Project identification and selection; External environmental analysis economic, social, technological and competitive factors; Legal requirements for establishment of a new unit; loans; Overrun finance; Bridge finance; Venture capital; Providing finance in Approaching financing institutions for loans.

Module 4

To identify different Discuss opportunities in small business. Small business Enterprise - Identifying the Business opportunity in various sectors - formalities for setting up of a small business enterprise - Institutions supporting small business enterprise - EDII (Entrepreneurship Development Institute of India), SLDO (Small Industries Development Organization NSIC (National small Industries Corporation Ltd. (CNSIC) NIESBUD (National Institute for Entrepreneurship and small Business Development) Sickness in small business enterprise causes and remedies.

Module 5

To understand about a project report relating to a small business. Project formulation - Meaning of a project report significance contents formulation planning commissions guidelines for formulating a project report - specimen of a project report, problems of entrepreneur's case studies of entrepreneurs.

Book of Study

1. Clifton, Davis S. and Fyvie, David E., Project Feasibility Analysis, John Wiley, New York.

References

1. Desai A. N., Entrepreneur and Environment, Ashish, New Delhi, 1990.
2. Drucker, Peter, Innovation and Entrepreneurship, Heinemann, London, 1985
3. Jain Rajiv, Planning a Small Scale Industry: A guide to Entrepreneurs, S.S. Books, Delhi, 1984
4. Kumar S. A., Entrepreneurship in Small Industry, Discovery, New Delhi, 1990

VDAMGC601-Principles of Management

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Introduction to Entrepreneur and Entrepreneurship-definition, traits and features, classification, role of Entrepreneurs

Module 2

Create an awareness about EDP, EDP concept, need for training, and phases of EDP, curriculum and contents for EDP training programme, support system target groups, target groups, institutions conducting EDP in India

Module 3

General awareness of edification of project financing new enterprises, promotion of a venture, opportunity analysis project identification and selection, external environmental analysis, venture capital

Module 4

To identify different opportunities in small business, small business enterprise, identifying business opportunities in various sectors, formalities for setting up of small business enterprise-institutions supporting small business enterprises, sickness in small business enterprise causes and remedies. Project formulation-guidelines for formulating a project report-specimen of project report-problems of Entrepreneurs- case studies of entrepreneurs

Book of Study

1. Desai A.N, Entrepreneur and Environment

References

1. Jain Rajiv, Planning A Small scale Industry: A Guide To Entrepreneurs, S.S Books

2. Mc Cleffand , D.C. and winter, W.G., Motivating Economic Achievement, Free Press, New York

VDAMGC602-Operations Research-II

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

Transportation problem: Introduction to TP, methods for finding IBFS, VAM method, optimal solution-Modi method, unbalanced TP and Degeneracy.

Module 2

Assignment Problem: Introduction to AP, mathematical formulation, solutions, Hungarian method, travelling salesman problem.

Module 3

Sequencing problem: Introduction to sequencing problem, n jobs through 2 machines, n jobs through k machines, GANTT.

Module 4

Network analysis, CPM, PERT.

Book of Study

1. Kanti Swarup, Gupta, Manmohan (2004) 10th edition, Operations Research – Principles and Practice.

References

1. Frederick S Hiller and Gerala Jlieberman, Introduction to Operations Research Tata Mcgraw Hill.
2. J K Sharma Operations research – Theory and Applications Macmillan.
3. Mittal S.K, Goel B.S (1990): Operations Research, Pragati Prakashan, Meerut.

VDAMSC603- Natural Language Processing

CREDITS: 4

TOTAL LECTURE HOURS: 4 HOURS/WEEK

Module 1

What is Natural Language Processing? Language Processing and Python, Natural Language Basics, Natural Language, Linguistics, Language Syntax and Structure, Language Semantics, Text Corpora, Natural Language Processing, Text Analytics; Processing and Understanding Text: Text Tokenization, Text Normalization, Understanding Text Syntax and Structure.

Module 2

Text Classification: What Is Text Classification? Automated Text Classification, Text Classification Blueprint, Text Normalization, Feature Extraction, Classification Algorithms, Evaluating Classification Models, Building a Multi-Class Classification System

Module 3

Text Summarization: Text Summarization and Information Extraction, important concepts, Text Normalization Feature Extraction, Key phrase Extraction, Topic Modelling, Automated Document Summarization.

Module 4

Text Similarity and Clustering: Important Concepts, Text Normalization, Feature Extraction, Text Similarity, Analysing Term Similarity, Analysing Document Similarity, Document Clustering.

Book of Study

1. Bird, S., Klein, E., & Loper, E. (2009). Natural language processing with Python: analyzing text with the natural language toolkit. "O'Reilly Media, Inc.".

References

1. Dipanjan Sarkar, Text Analytics with Python, Apress/Springer, 2016
2. Jurafsky, D., & Martin, J. H. (2014). Speech and language processing. Vol. 3. Prentice Hall.
3. Manning, C. D., Manning, C. D., & Schütze, H. (1999). Foundations of statistical natural language processing. MIT press.

VDAMSC604- Big Data Analytics

CREDITS: 5

TOTAL LECTURE HOURS: 5 HOURS/WEEK

Module 1

Introduction to Big Data: Big Data and its importance, 3V's, Impact of Big Data, Sources of Big Data, Big Data Adoption, **Processing Big Data**, Ecosystems of Big Data, PySpark: Spark with Python, Understanding Spark context, Interactive use of PySpark, Loading data in PySpark shell, Functional programming in python, Use of lambda with map, Use of lambda with filter.

Module 2

Introduction to RDDs: Abstracting data with RDDs, RDDs from parallelized collections, RDDs from external datasets, Partitions in data, Basic RDD transformations and action, Map and collect, Filter and count, Pair RDDs in PySpark, ReduceByKey and Collect, SortByKey and Collect, advanced RDD actions, CountingByKey, RDD creation and Transformation.

Module 3

Dataframe Essentials Concept: read, write and validate dataframe, search and filter dataframe, subsetting and cleaning ,API, Built-in functions, Working with dates, User-defined functions,join, Manipulating Dataframes, Aggregating Data in Dataframes, Joining and Appending Dataframes, Handling Missing Data in Dataframes. Interacting with dataframes using PySpark SQL, running SQL queries, SQL queries for filtering tables, Data visualization in PySpark using dataframes, PySpark dataframe visualization: create a dataframe from csv files, SQL queries on dataframe, Data visualization.

Module 4

PySpark MLlib: Overview, MF libraries,PySpark MLlib algorithms, Collaborative filtering,Model training and predictions, Model Selection and Tuning in MLlib, Model evaluation using MSE, Classification in MLlib: Data Formatting and Transformations, Feature hashing and label point, Train and Evaluate Models, Logistic, 1 vs Rest, Multilayer PC, Naive Bayes, Linear SVM, Decision Tree, Random Forest, Gradient Boosted Tree Regression (GBT), Clustering in PySpark, K-means, Latent Dirichlet Allocation, Gaussian Mixture Modeling Pattern Mining, Visualizing clusters.

Book of Study

1. Hurwitz, Alan Nugent, Fern Halper and Marcia Kaufman, Big Data for Dummies, John Wiley & Sons, 2013
2. Jeffrey Aven, Data Analytics with Spark using Python, Addison-Wesley Data & Analytics Series.

References

1. Silberschatz A, Korth H F and Sudharshan S, "Database System Concepts", Sixth Edition, Tata McGraw-Hill Publishing Company Limited, 2010.
2. Chambers, B., & Zaharia, M. (2018). Spark: The definitive guide: Big data processing made simple. " O'Reilly Media, Inc."
3. Thomas Drabas and Denny Lee, Learning Pyspark.