BS-601: MATHEMATICS-VI
Metric Spaces,Numerical Analysis and optional
दूरीक समष्टि, आंकिक विश्लेषण एवं वैकल्पिक

Course Objective: The objective of this course is to familiarize the students with basic concepts of Mathematics.

Scheme of Examination:

Total Marks - 150
Internal Marks- 25
External Marks- 125

There should be three sections in the question paper. All questions will be compulsory.

Section A (20 Marks): Will contain 10 objective questions. One from each unit, each having 2 marks.

Section B (35 Marks): Will contain 5 short answer type questions (each having internal choice) one from each unit, each having 7 marks

Section C (70 Marks): Will contain 5 long answer type questions (each having internal choice) one from each unit, each having 14 marks.

NOTE: QUESTION PAPER SHOULD BE SET IN BOTH THE LANGUAGES (i.e. HINDI & ENGLISH).

Course Contents:

UNIT I:

Definition and examples of metric spaces. Neighborhoods. Limit points, Interior points. Open and closed sets. Closure and interior. Boundary points. Subspace of a metric space. Cauchy sequences. Completeness, Cantor's intersection theorem, Contraction principle. Real numbers as a complete ordered field. Dense subsets. Baire Category theorem. Separable, first and second countable spaces.

दूरीक समष्टि की परिभाषा एवं उदाहरण,सामीप्य,सीमा बिन्दु, अंतः बिन्दु,विवृत्त एवं संवृत समुच्चय,संवरणक एवं अभ्यंतर,परिसीमा बिन्दु, दूरीक समष्टि की उप समष्टि। कौशी अनुक्रम,पूर्णता, केन्टर का सर्वनिष्ठ प्रमेय,संकुचन सिद्धांत,पूर्ण क्रमित क्षेत्र के रूप में वास्तविक संख्यायें, सघन समुच्चय,बेयर का संवर्ग प्रमेय । विघटीय, प्रथम एवं द्वितीय गणनीय समष्टि।

UNIT II:

Continuous functions. Extension theorem. Uniform continuity. Compactness, Sequential compactness. Totally bounded spaces, Finite intersection property. Continuous functions and compact sets. Connectedness.

सतत फलन,विस्तार प्रमेय,एकसमान सांतत्य। संहतता, अनुक्रमणीय संहतता,पूर्ण परिबद्ध समष्टि,परिमित सर्वनिष्ठ प्रगुण। संतत फलन एवं संहत समुच्चय, संबद्धता।

UNIT III:

Solution of Equations: Bisection, Secant, Regular Falsi. Newton, Method. Roots of second degree Polynomials, Interpolation, Largange interpolation, Divided Differences, Interpolation formulae using Differences, Numerical Quadrature, Newton-Cote's Formulae, Gauss Quadrature Formulae.

समीकरणों के हलः द्विभाजन,सीकेंन्ट,रेग्युलर फाल्सी तथा न्युटन विधि। द्वितीय घात बहुपदों के मूल। अर्न्तवेशन : लागरांज अर्न्तवेशन विभाजित अन्तर , अन्तर के उपयोग से अर्न्तवेशन सूत्र, संख्यात्मक क्षेत्रकलन न्युटन कोर्ट्स सूत्र गाउस क्षेत्रकलन सूत्र।

UNIT IV:

Linear Equations: Direct Methods for Solving Systems of Linear Equations (Guass elimination, LU Decomposition. Cholesky Decomposition), Iterative methods(Jacobi, Gauss-Seidel Reduction Methods),Ordinary Differential Equations: Euler Method, Single-step Methods, Runge-Kutta's Method, Multi-step Methods. Milne-simpson Method, Methods Based on Numerical Integration, Methods based on numerical Differentiation.

रैखिक समीकरणः रैखिक समीकरणों के निकाय को हल करने की प्रत्यक्ष विधियां (गाउस विलोपन,एल यू वियोजन,चोलेस्की वियोजन) पुनरावृती विधियां(जेकोबी,गाउस सिडेल) साधारण अवकल समीकरणः आयलर विधि,एकल चरण विधि, रूंग कुट्टा विधि,बहुचरण विधि, मिलने सिम्पसन विधि, संख्यात्मक समाकलन पर आधारित विधियां, संख्यात्मक अवकलन पर आधारित विधियां ।

UNIT V: ELEMENTARY STATISTICS

Measures of dispersion-range, inter quartile range, Mean deviation, Standard deviation, moments, skewness and kurtosis. Probability, Continuous probability, probability density function and its applications (for finding the mean, mode, median and standard deviation of various continuous probability distributions) Mathematical expectation, expectation of sum and product of random variables. Theoretical distribution- binomial, Poisson distributions and their properties and use, Moment generating functions.

विक्षेपण की मापें: परिसर,अन्तः चतुर्थक परिसर,माध्य विचलन,मानक विचलन,आघूर्ण,विषमता तथा ककुदता, प्रायिकता,सतत प्रायिकता,प्रायिकता घनत्व फलन तथा उनके अनुप्रयोग(सतत प्रायिकता बंटन के लिये माध्य,बहुलक,माध्यिका तथा मानक विचलन ज्ञात करने के लिये) गणितीय प्रत्यशा,यादृच्छिक चरों के योग एवं गुणन की प्रत्याशा। सैद्धांतिक बंटन–द्विपद,पॉयज़न बंटन तथा उसके गुणधर्म एवं उपयोग,आघूर्ण जनक फलन।

OR/अथवा

UNIT V: PRINCIPLES OF COMPUTER SCIENCE

Data Storage of bits Ram Memory. Mass storage-Coding Information of Storage. The Binary System Storing integers fractions, communication errors. Data Manipulation- The Central Processing Unit. The Stored Program concept. Programme Execution. Arithmetic/Logic Instruction. Computer-Peripheral Communication. Operation System :The Evolution of Operating System.(Dos, Window) Operating System Architecture. Coordinating the Machine's Activities. Other Architectures.

बिटों का डेडास्टोरेज,रेम,स्मृति। वृहद भण्डारण। भण्डारण की कूटकृत सूचना। बायनरी सिस्टम। पूर्णांक, भिन्नांक का भण्डारण, संचारण त्रुटियां। डाटा मेनिपूलेशन–सेन्ट्रल प्रोसेसिंग यूनिट,भण्डारित प्रोग्राम अभिधारणा। प्रोग्राम का संचालन। गणितीय/तार्किक निर्देश। कम्प्युटर–सह उपकरण(पेरीफेरल्स) के मध्य संचार। आपरेटिंग सिस्टमः का उद्भव.(Dos,Windows) आपरेटिंग सिस्टम आर्किटेक्चर कम्प्युटर मशीन की गतिविधियों का समन्वयन। अन्य आर्किटेक्चर

OR/अथवा

UNIT V: METHEMATICAL MODELING

The process of Applied Mathematics. Setting up first order differential equations. Qualitative solution sketching. Stability of solutions.Difference and differential equation models of growth and decay. Single species population model,Exponential and logistic population models.

प्रयुक्त गणित की विधि। प्रथम कोटि अवकल समीकरण की स्थापना। गुणात्मक हल चित्रण। हलों का स्थायित्व। अंतर एवं अवकल समीकरण मॉडल का विकास एवं क्षय। एकल स्पाइसेस पापूलेशन मॉडल,एक्सपोंनेशियल एवं लॉजिस्टिक पापूलेशन मॉडल्स।

Compulsory
Text Books:

1- R.R.Goldberg,Real Analysis,Oxford & IBH Publishing Co.N.Delhi,1970

2- G.F.Simmons,Introduction to Topology and Modem Analysis,McGraw Hill,1963
3- म.प्र. हिन्दी ग्रंथ अकादमी की पुस्तकें।
4- V.Raja Raman Programme C, Prentice Hall of India,1994.
5- C.E. Frooerg.Introduction to Numerical Analysis,(Second Edition L.Addison-Wesley-1979.

Reference Books:

1- T.M.Apostol,Mathematical Analysis.Norosa Publishing House.N.Delhi 1985
2- S.Lang.Undergraduate Analysis,Springer-Veriag,New York,1983
3- D.Somasundaram and B.Choudhary,Afirst Course in Mathematical Analysis,Narosa Publishing House,New Delhi 1997.
4- Shanti Narayan, A Course of Mathematical Analysis. S.Chand & Co.Delhi
5- R.K.Jain and S.K.Kaushik,Anintroduction to Real Analysis,S.Chand & Co. New Delhi 2000.
6- P.K.Jain and K. Ahmed Metric Spaces,Narosa Publishing House, N.Delhi 1996.
7- S.Lang,Undergraduate Analysis,Spruinger-Verlag,New York 1983
8- E.T.Copson,Metric Spaces,Cambridge University Press,1968
9- Henry,Mullish and Herbert,L.Copper,Spril of C: An Intruduction to Modern Programming,Jaico Publishers.
10- M.K.Jain,S.R.K.Iyengar,R.K.Jain.Numerical Methods Problems and Solutions,New Age International(P) Ltd.1996.
11- E.Blaguruswamy-Numerical Method Tata McGraw-Hill Pub.Com.New York.

Optional:

1- Elementary Statistics-

Test Books

1- Statistics by M.Ray
2- Mathematical Statistics by J.N.Kapoor,H.C.Saxena(S.Chand)
3- म.प्र. हिन्दी ग्रंथ अकादमी की पुस्तकें।

Reference Books:

1- Fundamentals of Mathematical Statistics,Kapoor and Gupta.

2-Principles of Computer Science

Text Books:

1- J.Glen Brokkshear, Computer Science: An Overview,Addition-Wesley.
2- Stanley B.Lippman, josee Jojoie, (C++ Primer 3rd Edition),Addision-Wesley

Total at least ten practicals.

3- म.प्र. हिन्दी ग्रंथ अकादमी की पुस्तकें।

3-Mathematical Modeling

Text Books:

1- Kapoor,J.N. : Mathematical models in Biology and Medicine EWp(1985)
2- SAXENA V.P.Bio-Mathematics an introduction, M.P.Hindu Growth Academy 1993.
3- Martin Braun C.S.Coleman,DA Drew (Eds)Differential Equation Models.
4- Steven J.B.Lucas W.P.,Straffin B.D.(Eds.)Political and Related Models, Vol.2.
5- म.प्र. हिन्दी ग्रंथ अकादमी की पुस्तकें।

Reference Books:

1- Culle
2- n Linen. Models in Biology.
3- Rubinow, SI : Introduction to Mathematical Biology,John Wiley and sons 1975.

BS-602: STATISTICS-VI

SQC and Numerical Methods

सांख्यिकीय गुण नियंत्रण तथा आंकिक विधियॉ

Course Objective: The objective of this course is to familiarize the students with basic concepts of Statistics.

Scheme of Examination:

Total Marks - 150
Internal Marks- 15
Practical Marks - 50
External Marks- 85

There should be three sections in the question paper. All questions will be compulsory.

Section A (15 Marks): Will contain 15 objective questions from all units each having 1 mark.

Section B (20 Marks): Will contain 5 short answer type questions (each having internal choice) one from each unit, each having 4 marks.

Section C (50 Marks): Will contain 5 long answer type questions (each having internal choice) one from each unit, each having 10 marks.

NOTE: QUESTION PAPER SHOULD BE SET IN BOTH THE LANGUAGES (i.e. HINDI & ENGLISH).

Course Contents:

UNIT I:

General theory of control charts, causes of variation, process and product control, 3σ -control limits, Control charts for variables - $\overline{X}$ and R chart, Critenon for detecting lack of control in $\overline{X}$ and R charts. Control chart for attributes- p, np and C chart, applications of c chart.

नियंत्रण चित्रों के सिद्धांत, विचरण के कारण, विधि नियंत्रण तथा उत्पाद नियंत्रण, 3σ - नियंत्रण सीमाएँ। चरों के लिये नियंत्रण चार्ट $\overline{X}$ तथा R चित्र। $\overline{X}$ तथा R चार्ट में नियंत्रण के अभाव की जांच के मापदण्ड। गुणों के लिये नियंत्रण चार्ट–p, np तथा C चार्ट। C चार्ट के अनुप्रयोग।

UNIT- II:

Principles of acceptance sampling, definition of AQL, LTPD, Producer's risk, consumer's risk, AOQL,LTPD,ASN,ATI and OC curve, Single and double sampling plans for attributes and variables.

स्वीकृति प्रतिचयन के सिद्धांतः AQL,LTPD, निर्माता की जोखिम,उपभोक्ता की जोखिम,AOQL, LTPD, ASN,ATI तथा OC वक्र की परिभाषा। गुणों तथा चरों के लिये एकल एवं दोहरी प्रतिचयन योजनाएँ।

UNIT-III:

Finite differences of different operators, ∇ and E operators, factorial representation of a polynomial, differences of zero. Binomial expansion, Concept of interpolation and extrapolation: Newton Gregory's forward and backward interpolation formulae for equal intervals.

विभिन्न क्रमों के परिमित अन्तर, ∇ तथा E संकारक, एक बहुपद का कारक प्रस्तुतीकरण, शून्य के अन्तर, द्विपद प्रसार। अन्तरगणन एवं बाह्यगणन की अवधारणा। न्यूटन का अग्रगामी तथा पश्चगामी अन्तरगणन सूत्र (समान अन्तर के लिये)।

UNIT IV:

Divided differences and their properties, Newton's formula for divided difference, Lagranges formula for unequal intervals, Numerical Quadrature: trapezoidalrule, Simpson's 1/3 (one-third) and 3/8(three-eight)rules.

विभाजित अन्तर तथा उनके गुण। न्युटन का विभाजित अंतर सूत्र। असमान अंतर के लिये लेग्राज का सूत्र। संख्यात्मक समाकलन–ट्रेपजाइडल नियम,सिम्पसन का एक–तिहाई सूत्र तथा सिम्पसन का तीन–अठाई सूत्र।

UNIT V:

Numerical differentiation, Numerical solutions of differential equations: Euler's method and Runge-Kutta method. Numerical solutions of polynomials & Newton Raphson and Regula falsi methods,Solutions of simultaneous equations-Gauss elimination and Gauss Seidal methods.

संख्यात्मक अवकलन, अवकलन समीकरणों का संख्यात्मक हल – इयूलर विधि तथा रूंज– कुट्टा विधि। युगपद समीकरणों का हल– गॉस विलोपन विधि तथा गॉस विलोपन विधि तथा गॉस सिड्ल विधि।

Books for References

1- Mukhopadhdyay,P. : Applied Statistics, new Central Book Agency Pvt. Ltd. Calcutta.
2- Srivastava O.S.: A Text Book of Demography, Vikas Publishing House, New Delhi.
3- Goon A.M.Gupta M.K. and Das Gupta B: Fundamentals of Statistics, Vol.II World Press Calcutta.
4- Kapoor and Gupta: Fundamental of Applied Statistics.
5- Chatfield C.(1980) : The Analysis of Times Series, IInd Edision Chapman and Hall. Distribution.

BS-603: COMPUTER SCIENCE-VI

Computer Network

Course Objective: The objective of this course is to familiarize the students with basic concepts of Computer Network.

Scheme of Examination:

Total Marks - 150
Internal Marks- 15
Practical 50
External Marks- 85

There should be three sections in the question paper. All questions will be compulsory.

Section A (15 Marks): Will contain 15 objective questions from all units each having 1 mark.

Section B (20 Marks): Will contain 5 short answer type questions (each having internal choice) one from each unit, each having 4 marks.

Section C (50 Marks): Will contain 5 long answer type questions (each having internal choice) one from each unit, each having 10 marks.

NOTE: QUESTION PAPER SHOULD BE SET IN BOTH THE LANGUAGES (i.e. HINDI & ENGLISH).

Course Contents:

UNIT-I:

Computer Network, Goals and Applications, Reference models- OSI and TCP/IP. A Comparative study. Network hardware- LAN, MAN and WAN and topologies, LAN components – File server, Workstations, Network Adapter Cards. Connection oriented and Connection less services.

UNIT-II:

Data communication system, data communication links, character codes, digital data rates, serial data formats, encoded data formats, error detection & correction. Transmission media- guided and unguided media, Switching Techniques- Circuit Switching, Packet Switching, Message Switching.

UNIT-III:

Data link protocol, character oriented protocol & bit oriented protocol, network architecture protocols, Ethernet, token bus & token ring.

UNIT-IV:

Internet basics: - Elements of the web, viewing web pages with a browser, using a browser for a mail, News and chat, security and privacy issue. Internet: advantage and disadvantage. Internet Service.

Web server and proxy server, Web caches, Web browser like Internet Explorer,Netscape Navigator,and Communication Suit, Internet Security issues,Embedded and Software based firewall,Data encryption and Digital Signature and Certificates.

UNIT-V:

The art of creating the website and home page. The HTML programming basics,Syntax and rules,Tables,Frames,Forms,Example of HTML page,Choice of colour,banners,Linking with HTML page, Div,Span,met tags, span, Introduction of DHTML, Java Script,Use of Java Script, Java Script Syntax, Data type Variable,Array, Operator and Expressions.

Text Book: Data & Network Communication by Michael A.Miller.

Reference Books:

1- Deitel & Deitel,Goldberg, “Internet and World Wide Web-How to Program” Pearson Education Asia, 2001.
2- Computer Networks- A.S.Tanenbaum.

BS-603: COMPUTER SCIENCE-VI

(Practical Exercise on Computer Networking)

1- Create a webpage that prints your name to the screen.
2- Create a webpage that prints the numbers 1-10, each number being a different colour.
3- Print a paragraph with 4-5 sentences. Each sentence should be a different font.
4- Print two lists with any information you want. One list should be an ordered list; the other list should be an unordered list.
5- Print a paragraph that is a description of a book; include the title of the book as well as its Author. Names and titles should be underlined,adjectives should be italicized and bolded.
6- Print some preformatted text of your choosing.
7- Create a page with a link at the top of it that when clicked will jump all the way to the bottom of the page. At the bottom of the page there should be a link to jump back to the top of the page.
8- Display an image that has a border of size 2, a width of 200, and a height of 200.
9- Display five different images. Skip two lines between each image. Each image should have a title.
10- Display an image that when clicked will link to a search engine of your choice.
11- Add a simple table to for storing.Train information(Train No. Name, Source, Destination,Time) without borders. Do thefollowing:

    1- Add border value of 1, save and view
    2- Add a border value of 5,save and view
    3- Make the top row a table header,save and view
    4- Align all data elements to the middle of their cells,save and view
    5- Divide Time into Departure Time,Arrival Time.

12-Write a JavaScript,which calculates sum or product depending on the drop down menu selection of two numbers, accepted using textbox anddisplay the result in the third textbox. The action performs on click event on button.

13-Write a Java Script which displays current date and time when page loads.

14-Write a Java Script that prompts the user for his or her name as the page load (via dialog box) and then welcome the user by name in the body of the page.

15-Create a Webpage using two image files, which switch between one another as mouse pointer mover over the images.

16-Write a Java Script, which calculates factorial of a number, accepted using textbox and displays the result in second textbox. The action performs on click event on button.

17-Write a Java Script which reverses the number accepted in textbox.

18-Create an HTML form which has number of textbooks like First Name,Last Name,Address and PinCode. Write a Java Script code to verify following on clock event of a button:

1- Pop up an alert indicating which textbox has left empty and setfocus on that specific textbox.
2- Give message"Thank you" if all text boxes are filled.
3- Pop Up an alert message if text within Pin code in not numeric value and greater than 6 digits and set focuson it till it is given proper value.

BS-604: FOUNDATION COURSE-I
(ENGLISH-III)
LANGUAGE & ASPECTS OF DEVELOPMENT

Course Objective: The objective of this course is to familiarize the students with basic concepts of English Language & Aspects of Development.

Scheme of Examination:

Total Marks - 100
Internal Marks- 15
External Marks- 85

There should be three sections in the question paper. All questions will be compulsory.

Section A (15 Marks): Will contain 15 objective questions from all unit each having 1 mark.

Section B (20 Marks): Will contain 5 short answer type questions (each having internal choice) one from each unit, each having 4 marks

Section C (50 Marks): Will contain 5 long answer type questions (each having internal choice) one from each unit, each having 10 marks.

Course Contents:

UNIT I:

1. William Wordsworth: " The World is Too Much With us"
2. K.Aludiapillai : " Communication Education and Information Technology
3. "Democratic Decentralization "
4. S.C.Dubey : " Basic Quality of Life"
5. Sister Nivedita: " The Judgment Seat of Vikramaditya"
6. Juliun Huxley: " War as a Biological Phenomenon"
7. Robert Frost : " Stopping by Woods on a Snowy Evening"
8. Ruskin Bond: " The Cherry Tree"

UNIT II: Short Essay of about 250-300 words

UNIT III: Translation of a short passage from Hindi to English.

UNIT IV: Drafting CV, writing e-mail message for official purpose

UNIT V : Language Skills:One-word substitution,homonyms,homophones,words that confuse,Punctuation,Idioms.

BS-605: FOUNDATION-II
COMPUTER CONCEPTS - II

Course Objective: The objective of this course is to familiarize the students with basic concepts of Basic Computer Information Technology-II.

Scheme of Examination:

Total Marks - **50**

External Marks-Practical **08**
External Marks-Theory **42**

There should be three sections in the question paper. All questions will be compulsory.

Section A (07 Marks): Will contain 7 objective questions from all units each having 1 mark

Section B (10 Marks): Will contain 5 short answer type questions (each having internal choice) one from each unit, each having 2 marks.

Section C (25 Marks): Will contain 5 long answer type questions (each having internal choice) one from each unit, each having 5 marks.

Course Contents:

UNIT I:

Word Processing: Word-

- Introduction to word Processing.
- MS Word: features, Creating, Saving and Operating Multi document windows, Editing Text selecting, Inserting, deleting moving text.
- Previewing documents, printing document to file page. Reduce the number of pages by one.
- Formatting Documents: paragraph formats, aligning Text and Paragraph, Borders and shading, Headers and Footers, Multiple Columns.

UNIT II:

Introduction to Excel - Excel & Worksheet:

- Worksheet basic
- Creating worksheet, entering data into worksheet, heading information, data text, dates, alphanumeric, values, saving & quitting worksheet.
- Opening and moving around in an existing worksheet.
- Toolbars and Menus, Keyboard shortcuts.
- Working with single and multiple workbook coping, renaming, moving, adding and deleting. Coping entries and moving between workbooks.
- Working with formulas & cell referencing.
- Autosum
- Coping formulas
- Absolute & Relative addressing.

UNIT III:

INTRODUCTION TO POWER POINT-

- Features and various versions
- Creating presentation using Slide master and template in various colour scheme.
- Working with slides make new slide move, copy, delete, duplicate, lay outing of slide, zoom in or out of a slide.
- Editing and formatting text: Alignment, editing, inserting, deleting, selecting, formatting of text, find and replace text.

UNIT IV:

POWER POINT-II

- Bullets, footer, paragraph formatting, spell checking.
- Printing presentation Print slides, notes, handouts and outlines.
- Inserting objects Drawing and Inserting objects using Clip Arts picture and charts.
- Slide sorter, slide transition effect and animation effects.

Presenting the show making stand alone presentation, Pack and go wizards.

UNIT V:

Evolution, Protocol, concept, Internet, Dial-up connectivity, leased line, VSAT Broad band, URLs, Domain names, Portals. E-mail, Pop & Web based Email. Basic of sending and receiving Emails, Email & Internet Ethics, Computer virus, Antivirus software wage, Web Browsers.

Books Recommended-

1- डॉ.एस.के.विजय,डॉ.प्रकज सिंह : कम्प्युटर विज्ञान एवं सूचना प्रोद्योगिकी,म.प्र.ग्रंथ अकादमी,भोपाल
2- डॉ.पंकज सिंह कम्प्युटर अध्ययन,राम प्रसाद एंड संस

Practical/CCE

MS-Power Point:

Creating new slide, formatting slide layout, slide show & sorter, Inserting new slide, slide no., date, time, chart, formatting slide, tool operation.

List of suggested practical work :

- Understanding of a dial up connection through modern.
- Configuring a computer for an e-mail and using outlook Express or Netscape Messenger.
- Registration an e-mail address
- Understanding of e-mail drafting
- Understanding of address book maintenance for e-mail
- Understanding of different mail program tools
- Send and receive functions of e-mail.