Program Syllabus Booklet

Doctor of Philosophy (Computer Applications)

(Ph.D. CA-381)

Session: 2017-18

University College of Computer Applications
Guru Kashi University, Talwandi Sabo

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Introduction about Program

A Doctor of Philosophy (Computer Applications) is a doctoral research degree and the highest level of academic qualification you can achieve. The degree normally takes between three and four years of full-time work towards a thesis offering an original contribution to your subject. Doctor of Philosophy in Computer Applications is an advanced, intensive program offered by the Computer Applications Department and designed to take students to the frontiers of knowledge in one of a number of key areas of Computer Applications. The Doctor of Philosophy in Computer Applications combines theory and practice in complementary, yet flexible, ways. The program has been designed to prepare students for careers in research (at universities, or government or industrial research laboratories), teaching (at colleges or universities), or advanced development (at hardware and software companies)

Course Work										
Study Scheme										
Sr.	Subject Code	Subject Name	Type of Subject T/P	(Hours Per Week)			No. of Credits	Internal Marks	External Marks	Total Marks
				L	T	P				
1	180101	Research Methodology	T	4	0	0	4	50	50	100
2	**Elective-I**									
3	381101	Recent Advances in Computer Applications	T	4	0	0	4	50	50	100
4	381102	Seminar	P	NA	NA	NA	2	100	NA	100
Total No. of Credits				12 /15						

Elective-I (Select one of the following subject)										
Sr.	Subject Code	Subject Name	Type of Subject T/P	(Hours Per Week)			No. of Credits	Internal Marks	External Marks	Total Marks
				L	T	P				
1	180102	Computer Applications in Research	T/P	1	0	2	2	100	NA	100
2	180105	Statistical Methods	T	3	0	0	3	50	50	100

Course Name: Research Methodology

Course Code: 180101

Semester: 1st

Credits:04

L T P

4 0 0

Course Contents

(Common for Doctor of Philosophy in Engineering, Education, Applied Science, Management,Computer Application, Commerce, Economics)

1) Research

Objectives of Research, Research Types, Research Methodology, Research Process – Flow chart, description of various steps, Selection of research problem.

2) Research Design

Meaning, Objectives and Strategies of research, different research designs, important experimental designs, Completely randomized, Randomized block, Latin Square, Factorial Experimental Design.

3) Methods of Data Collection

Types of data collection and classification, Observation method, Interview Method,

Collection of data through Questionnaires, Schedules.

4) Processing and Analysis of Data:

Editing, Coding, Classification of data

Statistical measures and their significance: Central tendencies, Variation, Skewness, Kurtosis. Correlation and Regression , Multiple Regression, Time Series Analysis, Parametric tests (t, z and F) , Chi Square test. Analysis of Variance, One - way ANOVA Factor Analysis, Centroid Method, Computer simulations using MATLAB/SPSS.

5) Probability Distributions

Binomial , Poisson , Exponential , Normal distributions,Frequency distribution,

CumulativeFrequency distribution, Relative Frequency distribution.

6) Sampling Methods:

Different methods of Sampling : Probability Sampling methods , Random Sampling, Systematic Sampling, Stratified Sampling, Cluster Sampling and Multistage Sampling. Non Probability Sampling methods, Sample size.

7) Testing of Hypotheses:

Testing of Hypotheses concerning Mean(s), Testing of Hypotheses concerning Proportion (s), Testing of Hypotheses concerning Variance(s)

8)   Report Writing and Presentation:

Types of reports, Report Format – Cover page, Introductory page, Text, Bibliography, Appendices,Typing instructions, Oral Presentation.

References:

1. Montgomery, Douglas C. (2007). *Design and Analysis of Experiments*.Wiley India.

2. Montgomery, Douglas C. & Runger, George C. (2003). *Applied Statistics & Probability for Engineers.* Wiley India.

3. Kothari C.K. (2004) .*Research Methodology- Methods and Techniques,*New Age International, New Delhi.

4. Krishnaswamy, K.N., Sivakumar, AppaIyer and Mathiranjan M. (2006). *Management Research Methodology; Integration of Principles, Methods and TechniqueS.* ,Pearson Education, New Delhi.

5. Chawla ,Deepak ,Sondhi ,Neena. (2011). *Research Methodology Concepts and Cases*. Vikas Publishing House Pvt Ltd .,New Delhi

6.Panneerselvam. R (2014). *Research Methodology*. PHI. New Delhi.

7. Cooper, D.R., Schindler,P.S. (2000). *Business Research Methods*. Tata McGraw Hill.

8.Gupta S P. (2011). *Statistical MethodS.* Sultan Chand & Sons, Delhi,

9. Ronald E Walpole. (2010). *Probability and Statistics for Engineers and Scientists.* International Edition, Pearson Education.

10. Chakravarty Pulak.(2017). *Quantitative Techniques for Management and Economics*. Himalaya Publishing House.

11..Tripathi P.C. (2007). *A Text Book of Research Methodology in Social Sciences*.Sultan Chand & Sons.

12. Bhattacharyya D.K. (2017). *Research Methods.* Sage Publications.

Elective-I

Course Name: Computer Applications in Research

Course Code: 180102

Semester: 1st

Credits: 02   **L T P**

                                                                                                        1 0 2

Course Contents

Common for all branches except Hindi, Punjabi, English, History and Religious Study

Unit 1

Generating Charts/Graphs in Microsoft Excel, Power Point Presentation, Web search, Use of Internet and www, Using search like Google etc.

Unit 2

SPSS concepts and its use for Statistical Analysis.

Unit 3

MatLaband its use for Statistical Analysis.

Unit 4

Introduction to the use of   LaTeX, Mendeley, Anti-PlagiarismSoftwares .

References:

1. Kogent Solutions. 2008. *Office 2007 in Simple Steps*. Dreamtech Press.

2. Jain S. 2010. (*2007).MS-OfficeTraining Guide*. BPB Publications.

3. Bansal R. K., Goel Ashok Kumar, Sharma Manoj Kumar.(2016). *MATLAB and its applications in Engg*. Second Edition ,Pearson Education, Delhi.

4. Sabine handan & Brian S. Everitt. (2004). *A Handbook of Statistical Analysis using SPSS.* Chapman & Hall / CRC Publication, USA.

Elective-I

Course Name: Statistical Methods

Course Code: 180105

Semester: 1st

Credits: 02

L T P

1 0 2

Course Contents

Probability distribution: uniform, binomial, Poisson, geometric, hyper geometric, negative binomial, multinomial, normal, exponential, Cauchy, Gamma, Beta, Weibull, log normal, logistic and Pareto.

Compound and truncated distributions: Central and non-central z, t and F. Bivariate normal. Distribution of quadratic forms and r-the order statistic.

Practical: Random experiments. Moments, Correlation and regression, Fitting of binomial, Poisson, normal, hyper geometric and negative binomial, Truncated binomial and Poisson. Log normal.

Course Name: Recent Advances in Computer Applications
Course Code: 381101
Semester: 1st

Credits:04

L T P

4 0 0

Course Contents
Group I

Introduction to IoT

Internet of Things - Physical Design- Logical Design- IoT Enabling Technologies - IoT Levels & Deployment Templates - Domain Specific IoTs - IoT and M2M - IoT System Management with NETCONF-YANG- IoT Platforms Design Methodology

Group-II

Introduction to Big Data

Big Data – Definition, Characteristic Features – Big Data Applications - Big Data vs Traditional Data - Risks of Big Data - Structure of Big Data - Challenges of Conventional Systems - Web Data – Evolution of Analytic Scalability - Evolution of Analytic Processes, Tools and Methods - Analysis v/s Reporting - Modern Data Analytic Tools, Introduction to Hadoop.

Group-III

Image Processing Fundamentals

Introduction – Elements of visual perception, Steps in Image Processing Systems – Digital Imaging System - Image Acquisition – Sampling and Quantization – Pixel Relationships – File Formats – Colour images and models - Image Operations – Arithmetic, logical, statistical and spatial operations.

Group IV

Cloud Computing

Introduction to Cloud Computing- Evolution of Cloud Computing, Server Virtualization, Web Services Deliver from the Cloud- Communication-as-a-Service, Infrastructure- as-a-Service, Monitoring- as-a- Service, Platform- as-a-Service, Software- as-a-Service.

Generic Cloud Architecture Design – Layered cloud Architectural Development – Virtualization Support and Disaster Recovery – Architectural Design Challenges

Group V

Machine Learning & Deep Learning:

Introduction to machine learning- Linear models (SVMs and Perceptions, logistic regression)- Intro to Neural Nets: Shallow Neural Network- Training a network: loss functions, back propagation and stochastic gradient descent.

History of Deep Learning- A Probabilistic Theory of Deep Learning- Back propagation and regularization, batch normalization- VC Dimension and Neural Nets-Deep Vs Shallow Networks

References:

1. Hersent Olivier, Boswarthick David, Elloumi Omar. (2012). *The Internet of Things – Key Applications and Protocols*. Wiley

2. Cotton Richard, Learning R. (2013).*A Step-by-step Function Guide to Data Analysis*, O'Reilly Media.

3. Gonzalez Rafael C. and Woods Richard E. (2008). *Digital Image Processing,* Third Edition, Pearson Education, New Delhi

4. Velte Toby, Velte Anthony, Elsenpeter Robert, Cloud Computing.(2009). *A Practical Approach.* McGraw-Hill Osborne Media.

5. Nielsen Michael**.** (2015). *Neural Networks and Deep Learning,* Determination Press.

Course Name: Seminar

Course Code: 381102

Semester: 1st

Credits: 02   **L T P**

                                                                                                                                                              0 0 0

Course Contents

Students will be given a topic related to recent trends in computer Software / Hardware and they will submit a report consisting of salient features about the topic. They will also prepare and submit PPT and deliver a seminar on the topic.

Total Number of Course	5
Number of Theory Course	4
Number of Practical Course	1
Total Number of Credits	12/15

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Academic Instructions

Attendance Requirements

A student shall have to attend 75% of the scheduled periods in each course in a semester; otherwise he / she shall not be allowed to appear in that course in the University examination and shall be detained in the course(s). The University may condone attendance shortage in special circumstances (as specified by the Guru Kashi University authorities). A student detained in the course(s) would be allowed to appear in the subsequent university examination(s) only on having completed the attendance in the program, when the program is offered in a regular semester(s) or otherwise as per the rules

Assessment of a course

Each course shall be assessed out of 100 marks. The distribution of these 100 marks is given in subsequent sub sections (as applicable).

Components	Attendance	Internal (50)			MST 1	MST2	External (50) ETE	Total
		Assignment						
		A1	A2	A3				
Weightage	10	10	10	10	30	30	50	
Average Weightage	10	10			30		50	100

Passing Criteria

The students have to pass both in internal and external examinations. The minimum passing marks to clear in examination is 40% of the total marks.