AIT 508   **DATA ANALYSIS USING SAS**   **3(2+1)**

Objective:
This course is meant for exposing the students in the usage of SAS package for analysis of data. It would provide the students hands on experience in the analysis of their research data. This course is useful to all disciplines.

Theory:
UNIT I
The SAS Language, SAS Data Sets, Choosing a Mode for Submitting SAS Programs, Windows and Commands in the SAS Windowing Environment, Submitting a Program in the SAS Windowing Environment, Reading the SAS Log, Viewing Your Results in the Output Window, Creating HTML Output, SAS Data Libraries, Using SAS System Options

UNIT II
Creating and Redefining Variables, Using SAS Functions, Selected SAS Character Functions, Selected SAS Numeric Functions, Using IF-THEN Statements, Grouping Observations with IF-THEN/ELSE Statements, Subsetting Your Data, Working with SAS Dates, Selected Date Informats, Functions, and Formats, Using the RETAIN and Sum Statements, Simplifying Programs with Arrays, Using Shortcuts for Lists of Variable Names

UNIT III
Using SAS Procedures, WHERE Statement, PROC SORT, PROC PRINT, PROC FORMAT, PROC MEANS, PROC FREQ, PROC TABULATE, PROC REPORT

UNIT IV
SET Statement, One-to-One Match Merge, One-to-Many Match Merge, OUTPUT Statement, Tracking and Selecting Observations with the IN= Option, Selecting Observations with the WHERE= Option, Changing Observations to Variables Using PROC TRANSPOSE

UNIT V
Concepts of ODS Graphics, Creating Bar Charts, Histograms, Box Plots, Scatter Plots with PROC SGPLOT, Examining the Distribution of Data with PROC UNIVARIATE, Producing Statistics with PROC MEANS, Testing Categorical Data with PROC FREQ, Examining Correlations with PROC CORR Creating Statistical Graphics with PROC CORR, Using PROC REG for Simple Regression Analysis, Creating Statistical Graphics with PROC REG, Using PROC ANOVA for One-Way Analysis of Variance, Reading the Output of PROC ANOVA

Practical:
1. Robust Estimation, Testing linearity and normality assumption, Estimation of trimmed means etc., Fitting and testing the goodness of fit of probability distributions;
2. Testing the hypothesis for one sample t -test, two sample t -test, paired t -test, test for large samples - Chi-squares test, F test, One way analysis of variance, contrast and its testing, pairwise comparisons;
3. Multiway classified analysis of variance - cross-classification, nested classification, factorial set up, fixed effect models, random effect models, mixed effect models, estimation of variance components; Generalized linear models - analysis of unbalanced data sets, testing and significance of contrasts, Estimation of variance components in unbalanced data sets - maximum likelihood, ANOVA, REML, MINQUE;
4. Bivariate and partial correlation; Linear regression, Multiple regression, Regression plots, Fitting of growth models - curve estimation models, examination of residuals; Discriminant analysis.Principal component analysis; Analysis of time series data. Spatial analysis;

Reference books:
1. Cody, R. "Learning SAS by Example: A Programmer's Guide." SAS Institute Inc., 2007.
2. Cody, R. P. and J. K. Smith. "Applied Statistics and the SAS Programming Language." 5th ed., Prentice Hall Inc., 2005.