ONLINE RESOURCES

http://bmsp-coep.vlabs.ac.in/List%20of%20experiments.html?domain=Biotechnology

CO's- PO's & PSO's MAPPING

CO's	PO's												PSO's		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	1	1	1	-	-	-	1	1	-	1	2	-	1
2	3	3	1	1	1	-	-	-	1	1	-	1	2	-	1
3	3	3	1	1	1	-	-	-	1	1	1	1	2	-	1
4	3	3	1	1	1	-	-	-	1	1	1	1	2	-	1
5	3	3	1	1	1	-	-	-	1	1	1	1	2	-	1
AVg.	3	3	1	1	1	-	-	-	1	1	1	1	2	-	1

1 - low, 2 - medium, 3 - high, '-' - no correlation

CS3491 ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING L T P C
3 0 2 4

COURSE OBJECTIVES:

The main objectives of this course are to:

- Study about uninformed and Heuristic search techniques.
- Learn techniques for reasoning under uncertainty.
- Introduce Machine Learning and supervised learning algorithms.
- Study about ensembling and unsupervised learning algorithms.
- Learn the basics of deep learning using neural networks.

UNIT I PROBLEM SOLVING 9

Introduction to AI - AI Applications - Problem solving agents – search algorithms – uninformed search strategies – Heuristic search strategies – Local search and optimization problems – adversarial search – constraint satisfaction problems (CSP).

UNIT II PROBABILISTIC REASONING 9

Acting under uncertainty – Bayesian inference – naïve bayes models. Probabilistic reasoning – Bayesian networks – exact inference in BN – approximate inference in BN – causal networks.

UNIT III SUPERVISED LEARNING 9

Introduction to machine learning – Linear Regression Models: Least squares, single & multiple variables, Bayesian linear regression, gradient descent, Linear Classification Models: Discriminant function – Probabilistic discriminative model - Logistic regression, Probabilistic generative model – Naive Bayes, Maximum margin classifier – Support vector machine, Decision Tree, Random forests.

UNIT IV ENSEMBLE TECHNIQUES AND UNSUPERVISED LEARNING 9

Combining multiple learners: Model combination schemes, Voting, Ensemble Learning - bagging, boosting, stacking, Unsupervised learning: K-means, Instance Based Learning: KNN, Gaussian mixture models and Expectation maximization.

UNIT V NEURAL NETWORKS 9

Perceptron - Multilayer perceptron, activation functions, network training – gradient descent

optimization – stochastic gradient descent, error backpropagation, from shallow networks to deep networks –Unit saturation (aka the vanishing gradient problem) – ReLU, hyperparameter tuning, batch normalization, regularization, dropout.

45 PERIODS

PRACTICAL EXERCISES: 30 PERIODS

1. Implementation of Uninformed search algorithms (BFS, DFS).
2. Implementation of Informed search algorithms (A*, memory-bounded A*).
3. Implement naïve Bayes models.
4. Implement Bayesian Networks.
5. Build Regression models.
6. Build decision trees and random forests.
7. Build SVM models.
8. Implement ensembling techniques.
9. Implement clustering algorithms.
10. Implement EM for Bayesian networks.
11. Build simple NN models.
12. Build deep learning NN models.

COURSE OUTCOMES:

At the end of this course, the students will be able to:

CO1: Use appropriate search algorithms for problem solving.
CO2: Apply reasoning under uncertainty.
CO3: Build supervised learning models.
CO4: Build ensembling and unsupervised models.
CO5: Build deep learning neural network models.

TOTAL:75 PERIODS

TEXT BOOKS:

1. Stuart Russell and Peter Norvig, “Artificial Intelligence – A Modern Approach”, Fourth Edition, Pearson Education, 2021.
2. Ethem Alpaydin, “Introduction to Machine Learning”, MIT Press, Fourth Edition, 2020.

REFERENCES

1. Dan W. Patterson, “Introduction to AI and ES”, Pearson Education,2007.
2. Kevin Night, Elaine Rich, and Nair B., “Artificial Intelligence”, McGraw Hill, 2008.
3. Patrick H. Winston, "Artificial Intelligence", Third Edition, Pearson Education, 2006.
4. Deepak Khemani, “Artificial Intelligence”, Tata McGraw Hill Education, 2013 (http://nptel.ac.in/).
5. Christopher M. Bishop, “Pattern Recognition and Machine Learning”, Springer, 2006.
6. Tom Mitchell, “Machine Learning”, McGraw Hill, 3rd Edition,1997.
7. Charu C. Aggarwal, “Data Classification Algorithms and Applications”, CRC Press, 2014.
8. Mehryar Mohri, Afshin Rostamizadeh, Ameet Talwalkar, “Foundations of Machine Learning”, MIT Press, 2012.
9. Ian Goodfellow, Yoshua Bengio, Aaron Courville, “Deep Learning”, MIT Press, 2016.

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3	2	1	2	1	1	-	-	-	2	1	1	3	1	1	1
4	3	1	3	1	-	-	-	-	2	1	2	1	2	2	2
5	3	1	1	2	2	-	-	-	3	1	2	3	2	1	2
AVg.	2	1	2	2	1	-	-	-	2	2	2	3	2	2	2

1 - low, 2 - medium, 3 - high, '-"- no correlation

BM3651 FUNDAMENTALS OF HEALTHCARE ANALYTICS L T P C
3 0 0 3

COURSE OBJECTIVES:

The objective of this course is to enable the student to

- Understand the statistical methods for the design of biomedical research.
- Comprehend the fundamental of mathematical and statistical theory in the application of Healthcare.
- Apply the regression and correlation analyze in the healthcare data.
- Understand the Meta analysis and variance analysis.
- Interpret the results of the investigational methods.

UNIT I INTRODUCTION 9

Introduction, Computers and bio statistical analysis, Introduction to probability, likelihood & odds, distribution variability. Finding the statistical distribution using appropriate software tool like R/ Python.

UNIT II STATISTICAL PARAMETERS 9

Statistical parameters p-values, computation, level chi square test and distribution and hypothesis testing -single population proportion, difference between two population proportions, single population variance, tests of homogeneity. Testing of statistical parameters using appropriate software R / Python.

UNIT III REGRESSION AND CORRELATION ANALYSIS 9

Regression model, evaluating the regression equation, correlation model, correlation coefficient. Finding regression, correlation for the data using appropriate software like R / Python.

UNIT IV ANALYSIS OF VARIANCE 9

META analysis for research activities, purpose and reading of META analysis, kind of data used for META analysis, completely randomized design, randomized complete block design, repeated measures design, factorial experiment. Testing the variance using appropriate software tool like R / Python.

UNIT V CASE STUDIES 9

Epidemical reading and interpreting of epidemical studies, application in community health, Case study on Medical Imaging like MRI, CT. Case study on respiratory data, Case study on ECG data.

TOTAL: 45 PERIODS

COURSE OUTCOMES

On successful completion of this course, the student will be able to

CO1:Define the new and existing statistical methodology for their research problem.

CO2:Explain p- values for different statistical test.

CO3:Analyze the biomedical research data and able to report the study results.

CO4:Enumerate the Meta analysis and variance analysis.