गुरु घासीदास विश्वविद्यालय
(केन्द्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केन्द्रीय विश्वविद्यालय)
कोनी, बिलासपुर – 495009 (छ.ग.)

Guru Ghasidas Vishwavidyalaya
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Koni, Bilaspur – 495009 (C.G.)

List of New Course(s) Introduced

Department	**:** *Computer Science and Information Technology*
Programme Name	*: MCA*

Academic Year : 2020-21

List of New Course(s) Introduced

Sr. No.	Course Code	Name of the Course
	MCA-301	Machine Learning
	MCA-204(Elective-III)-(3)	Neural networks and Deep Learning
	MCA-304(Elective-V)-(3)	Data Science using Python

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Department of CSIT, GGV, Bilaspur, C.G

Minutes of the Meeting of Board of Studies

The Board of Studies meeting for curriculum structure / syllabus design of M.C.A 2 Year degree course was held on **04/07/2020 at 3:00 PM** through online mode. Following B.O.S members were present in the meeting

1. Prof. R.S. Jadon, External Member of B.O.S
2. Prof. A.K.Saxena, Chairman, B.OS
3. Dr. Rajwant Singh Rao, Internal Member of B.O.S

Following are the resolution of the meeting

1. The enclosed scheme of Curriculum structure / Syllabus for MCA 2 Year degree course is designed as per the latest requirement. The contents of each paper will be supplied through Head of the department, CSIT.
2. Bridge course (non credit course) for non IT back ground students is included in the curriculum structure / syllabus.
3. The curriculum structure / syllabus of MCA 2 year degree course is recommended from the academic session 2020-21.

(Prof. R.S.Jadon)
e-mail consent attached
Meeting held online

(Prof. A.K.Saxena)

(Dr. R. S. Rao)

15/07/2020

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SYLLABUS FOR MCA 2 YEAR DEGREE COURSE

Effective from Session 2020-21

Semester 3

Sl.no	Subject Code	Title	Credit		Marks		Credits
			L	P	Internal	External	
1	MCA-301	Machine Learning	4		40	60	4
2	MCA-302	Computer Graphics and Multimedia	4		40	60	4
3	MCA-303	Data Mining and Data Warehousing	4		40	60	4
4	MCA-304	Elective V	4		40	60	4
5	MCA-305	Elective VI	4		40	60	4
6	MCA-306	Lab based on V / VI		2			2
7	MCA-307	Minor Project		2		100	2
		Total	20	04	200	500	26

Semester 4

Sl.no	Subject Code	Title	Credit		Marks		Credits
			L	P	Internal	External	
1	MCA-401	Major Project	-	-	-	500	22
		Total	-	-	-	-	22

Electives

Sl.No	Paper Code	(1)	(2)	(3)
1	MCA-104(Elective-I)	Advanced JAVA Programming	Probability and Statistics	Linux Operating System and Shell Programming
2	MCA-105(Elective-II)	Computer Network	Mobile Application Programming	V.B.Net Programming
3	MCA-204(Elective-III)	E-Commerce	Cloud Computing	Neural networks and Deep Learning
4	MCA-205(Elective-IV)	Web Technology	Image Processing	Pattern Recognition
5	MCA-304(Elective-V)	Big Data Analytics	Advanced Operating System	Data Science using Python
6	MCA-305(Elective-VI)	Compiler Design	Network Security	Parallel processing

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MCA- 301

Machine Learning

1. **Introduction**: Meaning and need of Machine Learning, Types of Machine Leaning: Supervised Learning, Unsupervised Learning, Semi Supervised Learning, Reinforcement Learning, Applications of Machine Learning, Type of Data in Machine Learning, Data Repository

2. **Introduction to Feature Analysis and Bayesian Theory**: Meaning of patterns and pattern classification, feature selection and curse of dimensionality, Bayesian theorem and concept learning, examples.

3. **Supervised Learning**: Introduction to supervised learning, its examples, classification models, classification algorithms with Implementation: k-nearest neighbor (kNN), Decision Tree, Random forest, Support Vector Machine (SVM),

4. **Unsupervised Learning** : Introduction to unsupervised learning, metrics for evaluating a feature, Clustering, types of clustering techniques, partitioning, hierarchical and density based clustering

5. **Modeling a classifier**: Validation, classification and prediction accuracy, confusion matrix, learning, bootstrap aggregation (bagging) , boosting, ensembles for classification

Readings:

1. Pattern Classification 2nd Edition By R.O. Duda, Hart, Stork (2001) ,John wiley, New York.

2. Pattern Recognition : Technique and Applications By Shinghal (2006) ,Oxford University Press, New Delhi.

3. Christopher M. Bishop, "Pattern Recognition and Machine Learning", Springer, 2006

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[Syllabus for MCA 2 Year Degree Course, Effective from the session 2020-21]

MCA-204   ELECTIVE-III   (3)

Neural Networks and Deep Learning

1. Introduction to biological neuron, artificial neuron, biological neuron vs. artificial neuron, evolution of neural networks, basic models of artificial neural networks(ANN) : connections, learning :- supervised, unsupervised, reinforcement, activation functions, important terminology of ANN. McCulloh-Pitts neuron, linear separability, types of neural networks.

2. Perceptron Networks, implementation of AND gate, OR gate, NAND gate etc., Gradient descent algorithm, implementation of AND gate, OR gate, NAND gate etc., Building a neural controller for obstacle avoidance, Pseudo inverse solution, nonlinear separability, Back propagation(BP) networks, Derivation of BP algorithm for single hidden layer architecture, momentum terms, implementation of XOR problem using BP algorithm.

3. Radial basis function neural network (RBFNN): architecture, training algorithm, Recurrent neural network(RNN) : architecture, training algorithm, Back propagation through time (BPTT). Real time recurrent learning algorithm(RTRL), Functional link artificial neural networks (FLANN): architecture, training, delta learning rule, Extreme Learning Machine(ELM): architecture, learning algorithm, Modified multilayer neural network, modified Back propagation (BP) algorithm, Self organizing map(SOP)

4. Deep Learning : Introduction, Long short term memory(LSTM) network, Convolution neural network, Boltzman Machine network.

5. Applications: function optimization, classification, prediction, detection

Readings:

1. Neural Networks and Learning machines by Simon Haykin, PHI, 3rd Edition
2. Neural Network Design by M. Hagan, 2nd Edition, eBook
3. Principles of Soft Computing by S. N. Shivanandam and S. N. Deepa, Wiley, 2nd Edition
4. Artificial neural networks by B. Yegnanarayana, PHI.
5. Deep Learning by John D. Kelleher, MIT Press.
6. Neural networks and Deep learning by Charu C. Aggarwal, Springer, 1st Edition, 2018.
7. Research papers

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[Syllabus for MCA 2 Year Degree Course, Effective from the session 2020-21]

MCA- 304   ELECTIVE-V   (3)

Data Science using Python

1. **Introduction to Python:** Introduction to python, variable, data type, control statements, loop statements, functions.
2. **Python for Data Science :** Numpy, Pandas, Matplotlib ,Seaborn etc
3. **Introduction to Data Science:** Introduction to data science, Overview of the data science process, Data PreProcessing.
4. **Machine Learning :** Introduction to machine learning, Linear regression and regularization, Model selection and evaluation, **Classification:** KNN, decision trees, SVM.
5. **Clustering:** K-means, hierarchical clustering, **Dimensionality reduction:** PCA and SVD, Text mining and information retrieval, Network analysis,

Readings

1. James, G., Witten, D., Hastie, T., Tibshirani, R. An introduction to statistical learning with applications in Springer, 2013.
2. Han, J., Kamber, M., Pei, J. Data mining concepts and techniques. Morgan Kaufmann, 2011.
3. Hastie, T., Tibshirani, R., Friedman, J. The elements of statistical learning 2nd edition Springer.
4. Murphy, K. Machine learning: A probabilistic perspective, MIT Press.
5. Manning :Big Data using Python

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