MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

COURSE PLAN

Department	**Computer Science and Engineering**		
Course Name	Deep Learning & Applications	Course Code	CSE 5214
Semester	II	Curriculum	2022
Name of the faculty	P. C. SIDDALINGASWAMY	Academic year	2023-24
No. of Contact Hours/Week	L T P C: 3 1 0 4		

COURSE OUTCOMES (CO'S)

At the end of this course, the student should be able to:		**No. of Hours**	**Marks**
CO1	Explain the basic principles behind different learning mechanisms	9	20
CO2	Demonstrate the architecture design of deep feedforward networks	12	25
CO3	Analyse regularization and optimization for training deep models.	9	20
CO4	Design convolutional neural networks and transfer learning techniques.	11	25
CO5	Apply autoencoder, time series and generative models for different applications	7	10
Total hours/ Marks		**48**	**100**

ASSESSMENT PLAN

Components	Quiz/Assignments	Sessional Tests	End Semester/Make - Up Examinations
Duration	Quiz 1 [MCQ] Quiz 2 [Surprize] Quiz 3[Open book] [30 Mins each] Quiz 4[Take home]	Midterm [120 Mins each]	End sem exam [3 Hours]
Weightage	10 % [5M+5M] 10 % [5M+5M]	30% [15M+15M]	50% [50M]
Typology of Questions	Applying, Analysing and Evaluating	Understanding, Applying, Analysing and Evaluating	Understanding, Applying, Analysing and Evaluating
Pattern	Quizzes (MCQs and Descriptive)	Short Answer Questions, Descriptive Questions and Design Questions	Short Answer Questions, Descriptive Questions and Design Questions
Schedule	Quiz 1: Calendared activity	Calendared activity	End of semester
	Quiz 2: Calendared activity		
Topics covered	Quiz 1: L1 to L12	Sessional 1: L1 to L16 & Sessional 2: L17 to 34	Exam: L1 to L48
	Quiz 2: L13 to L23		

LESSON PLAN

Lecture No.	Topic	CO's addressed
L0	Course overview	-
L1	Introduction to Deep learning	CO1
L2	Fundamental concepts of neural network	CO1
L3	Activation functions	CO1
L4	Learning algorithms	CO1
L5	Learning algorithms contd.	CO1
L6	Learning tasks	CO1
L7	Linear Regression problem	CO1
L8	Perceptron	CO1
L9	Classification problem	CO1
L10	Backpropagation NN contd.	CO2
L11	Backpropagation NN contd.	CO2
L12	Overfitting and underfitting	CO2
L13	Hyperparameters and validation sets	CO2
L14	Bias and variance	CO2
L15	Loss functions	CO2
L16	Building a simple binary classifier	CO2
L17	Performance measures	CO2
L18	Multiclass classification	CO2
L19	Multilabel classification	CO2
L20	Stochastic Gradient descent	CO2
L21	Batch gradient descent	CO2
L22	Regularization for deep learning	CO3
L23	L1 regularization	CO3

L24	L2 regularization	CO3
L25	Dataset augmentation	CO3
L26	Early stopping	CO3
L27	Bagging and other ensemble models	CO3
L28	Dropout	CO3
L29	Optimization methods	CO3
L30	Parameter initialization strategies	CO3
L31	Convolutional networks	CO4
L32	Pooling	CO4
L33	Fully connected layer	CO4
L34	Better activation functions	CO4
L35	Faster optimizers	CO4
L36	Architecture of CNN - AlexNet	CO4
L37	Architecture of CNN - ResNet	CO4
L38	Object detection using YOLO	CO4
L39	Recurrent neural networks	CO4
L40	Encoder decoder sequence architectures	CO4
L41	LSTM models	CO4
L42	Autoencoders	CO5
L43	Variational autoencoders	CO5
L44	GANs	CO5
L45	Deep convolutional GANs	CO5
L46	SDL – Applications of DL (vision)	CO5
L47	SDL – Applications of DL (vision)	CO5
L48	SDL – Applications of DL (vision)	CO5

References:

1	Ian Goodfellow, Yoshua Bengio and Aaron Courville, " Deep Learning", MIT Press, 2017.
2	Simon J.D. Prince, "Understanding deep learning", MIT Press, 2023
3	Aurelien Geron, "Hands-On Machine Learning with Scikit-Learn, Keras & Tensorflow, OReilly Publications
4	François Chollet, "Deep learning with Python", Manning press 2021

Submitted by:
Name of the faculty
P. C. SIDDALINGASWAMY

(Signature of the faculty)

Date: 05/01/2024

Approved by:

(Signature of HOD)

Date: 05/01/2024

COURSE PLAN – ADDITIONAL DETAILS

At the end of this course, the student should be able to:		No. of contact Hours	Marks	Program outcomes (PO's)	Learning outcomes (LO's)	PSO	BL
CO1	Explain the basic principles behind different learning mechanisms	9	20	1,5	1	_	2
CO2	Demonstrate the architecture design of deep feedforward networks	12	25	1,5	3	_	2
CO3	Analyse regularization and optimization for training deep models.	9	20	1,5	2	_	4
CO4	Design convolutional neural networks and transfer learning techniques.	11	25	1,5	1,3	_	4
CO5	Apply autoencoder, time series and generative models for different applications.	7	10	1,5	1,3	-	3
Total hours/ Marks		**48**	**100**				

Course Articulation Matrix (NBA)

CO	PO1	PO2	PO3	PO4	PO5
CSE5005.1	2	_	_	_	2
CSE5005.2	2	_	_	_	2
CSE5005.3	2	_	_	_	2
CSE5005.4	2	_	_	_	2
CSE5005.5	2	_	_	_	2
Average Program Articulation Level	**2**	**0**	**0**	**0**	**2**

IET – Course Learning Outcomes (CLO's) mapping with AHEP LO's

Course Learning Outcome	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18
CSE5214.1	✓																	
CSE5214.2	✓																	
CSE5214.3	✓																	
CSE5214.4			✓															
CSE5214.5			✓															

Abbreviations

1. **CO – Course outcome**
2. **PO – Program outcome**
3. **PSO – Program Specific outcome**
4. **LO – Learning outcome**
5. **CLO – Course Learning outcome**
6. **BL – Blooms Taxonomy**
7. **AHEP – The Accreditation of Higher Education Programmes**