SYLLABUS FOR BOARD OF STUDIES ADOPTION — generated from the live catalogue record

Deep Learning with TensorFlow and PyTorch

S-06A · 5 days (configurable 1–5 days) · Informatics · AI · Years: 3rd, PG

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OVERVIEW

Neural network fundamentals through to a trained image or text model with measured accuracy.

Deep learning powers modern AI products; a student who has trained and measured a real neural network in both major frameworks holds a strongly differentiated skill.

HOURS AND CREDIT POSITION

Contact hours: 40 Guided project: 20 Self-study: 0 Notional total: 60

Credit claim: 2
60 notional hours ÷ 30 hours per credit (NSQF track, UGC Micro-credentials Guidelines §5.3.3) = 2 credits.

COURSE OUTCOMES

CO1. Explain how a neural network learns through backpropagation (K2)
CO2. Build and train a neural network in TensorFlow and PyTorch (K3)
CO3. Construct a convolutional network for image classification (K3)
CO4. Apply regularisation to improve model generalisation (K4)
CO5. Fine-tune a pre-trained model and report its measured accuracy (K4)

COURSE CONTENT — MODULES

Hours shown are the recommended format; module time scales proportionally when the engagement runs 1–5 days.

Module 1 — Neural network foundations (5h recommended)
Theory: Neurons, activation functions, the forward pass, loss
Lab: Compute a forward pass by hand and in code
Output: Forward-pass notebook

Module 2 — Training mechanics (5h recommended)
Theory: Backpropagation, gradient descent, optimisers
Lab: Train a small network from scratch
Output: Training notebook

Module 3 — Frameworks (5h recommended)
Theory: TensorFlow and PyTorch, tensors, automatic differentiation
Lab: Rebuild the network in both frameworks
Output: Two-framework notebook

Module 4 — Convolutional networks (5h recommended)
Theory: Convolution, pooling, image-classification architecture
Lab: Build an image classifier
Output: CNN notebook

Module 5 — Sequence models (5h recommended)
Theory: Recurrent networks and an introduction to attention
Lab: Build a sequence model
Output: Sequence-model notebook

Module 6 — Regularisation and tuning (5h recommended)
Theory: Dropout, batch normalisation, learning-rate schedules
Lab: Improve generalisation on a model
Output: Tuning report

Module 7 — Transfer learning (5h recommended)
Theory: Fine-tuning pre-trained models
Lab: Fine-tune a pre-trained model
Output: Fine-tuning notebook

Module 8 — Capstone (5h recommended)
Theory: An image or text model to a measured accuracy
Lab: Train and measure a capstone model
Output: Capstone model + accuracy report

ASSESSMENT SCHEME (100 MARKS)

Continuous lab exercises — 40 marks
Capstone project & demonstration — 40 marks
Quiz & viva voce — 20 marks

CO–PO MAPPING

CO1 !’ PO1 (strength 2)
Backpropagation is the foundational theory of the field.

CO2 !’ PO5 (strength 2)
The frameworks are the profession's modern tools.

CO3 !’ PO3 (strength 2)
Building a CNN is solution development.

CO4 !’ PO4 (strength 2)
Regularisation choices come from investigating model behaviour.

CO5 !’ PO4 (strength 2)
Measuring fine-tuned accuracy is experimental investigation.

EVERY PARTICIPANT RECEIVES

- Certificate of completion
- Course material
- LMS access
- Interview question bank
- Mock interview & viva practice
- Optional nasscom NSQF assessment (priced per candidate on your quotation)

FEE

¹1,500 per student, incl. GST
Excludes the optional nasscom assessment where offered. Final pricing on your college's quotation.

DESIGNED BY

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