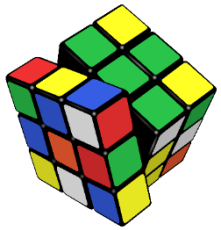


Big Data Engineering For Analytics

OVER **7,600** GRADUATE PROGRAMME ALUMNI

OFFERING OVER **220** ENTERPRISE IT, INNOVATION & LEADERSHIP PROGRAMMES

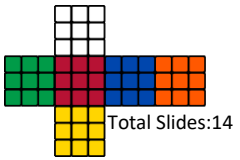
TRAINING OVER **166,000** DIGITAL LEADERS & PROFESSIONALS

Big Data Engineering

Common module for the following certificates:

EBA5006 - Specialist Cert - Big Data Analytics

SWE5003 - Specialist Cert - Engineering Big Data



Vision and Mission

Vision

Enabling a digital economy that is always learning and always leading

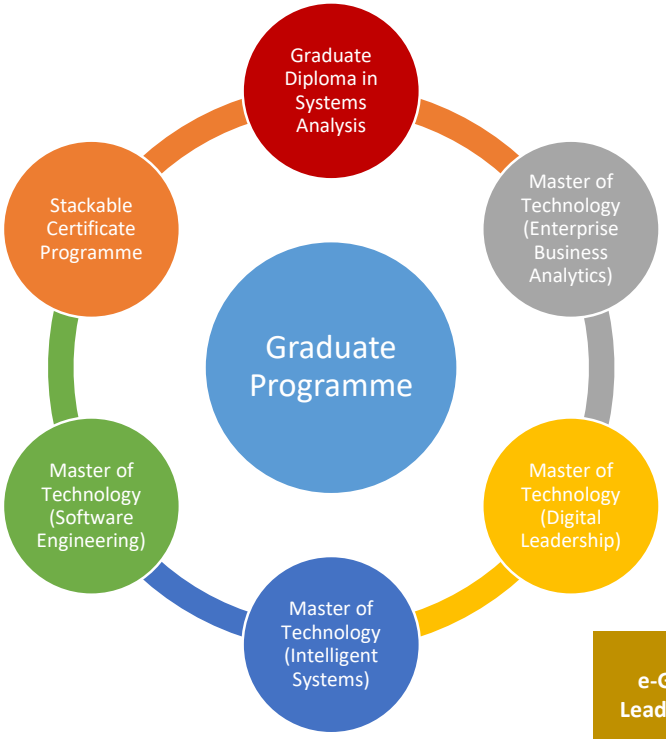
Mission

Developing digital talent through education, applied research, consulting and career services

NUS-ISS Learning Pathways

Our Practice-based Education

Education > Research > Consulting



e-Government Leadership Centre

Smart Health Leadership Centre

Our Key Customers

Public Sector

GovTech Singapore
Inland Revenue Authority of Singapore
DSTA
Infocomm Media Development Authority
MINDEF Singapore
Housing & Development Board
SkillsFuture SG
Land Transport Authority

Education

NUS National University of Singapore

Financial

OCBC Bank
DBS Bank
SoftBank Group

Infocomm

CrimsonLogic
ST Electronics
Singtel
IBM
ncs making IT happen
StarHub

Energy

SPgroup
Energy Market Authority

Entertainment & Hospitality

Singapore Pools
Resorts World
Marina Bay Sands Singapore

Healthcare & Pharmaceutical

SingHealth
Yishun Health National Healthcare Group
Khoo Teck Puat Hospital Alexandra Health
Jurong Health
NCSS National Council of Social Service
IHiS

Logistics & Transportation

PSA The World's Port of Call
Singapore Airlines
Keppel
Changi

Trade, Association & Chamber

Singapore Business Federation Apex Business Chamber

Manufacturing

HP
Bosch
Infineon
ST Aerospace

Others

Lions Befrienders Singapore
Forrester
CapitaLand

Our Partners

Digital Products & Platforms

- Architecting Platforms as a Business #
- Certified Scrum Product Owner
- Certified ScrumMaster
- Digital Products Delivery
- Digital Product Strategy #
- Managing Business Analytics Projects #
- Managing Digital Products #
- Product Thinking for Organisations
- Strategic Product Market Fit

Cybersecurity

- AI and Cybersecurity
- (ISC)² CCSP CBK Training Seminar
- (ISC)² CISSP CBK Training Seminar #
- (ISC)² CSSLP CBK Training Seminar
- (ISC)² SSCP CBK Training Seminar
- Cyber Security for ICT Professionals
- Cybersecurity Risk Awareness
- Design Secure Mobile Architecture
- Developing Cybersecurity Architecture
- Managing Cybersecurity Risk
- Platform Security #
- Secure Software Development Lifecycle for Agile #
- Securing IoT

StackUp – Startup Tech Talent Development

- Autonomous Decision Making With Reinforcement Learning
- Containers for Deploying and Scaling Apps
- Data and Feature Engineering for Machine Learning
- Feature Extraction and Supervised Modeling with Deep Learning
- Python for Data, Ops and Things
- RESTful APIs Design
- Sequence Modeling with Deep Learning
- Supervised and Unsupervised Modeling with Machine Learning

Digital Agility

- Certified Scrum Product Owner
- Agile Testing
- Business Agility Bootcamp
- Business Analysis for Agile Practitioners
- Certified ScrumMaster
- Coaching for Agile Teams
- DevOps Foundation with BizOps
- Essential Practices for Agile Teams
- Site Reliability Engineering - Processes and Management
- Systems Thinking & Root Cause Analysis

Software Systems

- Architecting Platforms as a Business #
- (ISC)² CISSP CBK Training Seminar #
- Agile Testing
- Architecting IOT Solutions #
- Architecting Software Solutions #
- Architecting Systems For Real Time Data Processing #
- Autonomous Decision Making With Reinforcement Learning
- Big Data Engineering for Analytics #
- Cloud Native Solution Design #
- Design Secure Mobile Architecture #
- Designing Intelligent Edge Computing #
- DevOps Engineering and Automation #
- Digital Product Strategy #
- Envisioning Smart Urban IoT Solutions
- Essential Practices for Agile Teams
- Humanizing Smart Systems #
- Information Architecture for Data-Driven Insights #
- Object Oriented Analysis & Design
- Object Oriented Design Patterns
- Platform Engineering #
- Platform Security #
- Secure Software Development Lifecycle for Agile #
- Securing IoT
- Service Design #
- NUS Certificate in Digital Solutions Development – Design #
- NUS Certificate in Digital Solutions Development – Foundations #
- NUS Certificate in Digital Solutions Development - Mobility Applications #
- NUS Certificate in Digital Solutions Development – Web Application #
- NUS Graduate Diploma in Systems Analysis #
- NUS Graduate Diploma in Systems Analysis - Capstone & Internship #
- NUS-ISS Stackable Certificate Programmes in Digital Solutions Development #

Data Science

- Advanced Customer Analytics #
- Big Data Engineering for Analytics #
- Campaign Analytics #
- Conversational UIs #
- Complex Predictive Modelling & Forecasting #
- Customer Analytics #
- Data Analytics Process and Best Practice II #
- Data Driven Decision Making
- Data Governance & Protection #
- Data Storytelling #
- Feature Engineering and Analytics using IOT Data #
- Graph and Web Mining #
- Health Analytics #
- Managing Business Analytics Projects #
- New Media and Sentiment Mining #
- Predictive Analytics - Insights of Trends and Irregularities #
- Recommender Systems #
- Service Analytics #
- Social Media Analytics
- Statistics for Business II #
- Statistics Bootcamp #
- Text Analytics #
- Text Processing using Machine Learning #
- Web Analytics & SEO

NUS National University of Singapore | iss INSTITUTE OF SYSTEMS SCIENCE

EXECUTIVE EDUCATION

Digital Strategy & Leadership

- AI and Cybersecurity
- Certified Scrum Product Owner
- e-Government Leadership
- (ISC)² CCSP CBK Training Seminar
- (ISC)² CISSP CBK Training Seminar #
- (ISC)² CSSLP CBK Training Seminar
- (ISC)² SSCP CBK Training Seminar
- Business Agility Bootcamp
- Business Analysis for Agile Practitioners
- Business Process Reengineering
- Certified Enterprise Architecture Practitioner Course
- Cyber Security for ICT Professionals
- Cybersecurity Risk Awareness
- Data Driven Decision Making #
- Data Governance & Protection #
- Design Secure Mobile Architecture #
- Developing Cybersecurity Architecture
- Digital Business Analysis
- Digital Transformation Planning
- Innovation Bootcamp
- Managing Cybersecurity Risk
- Platform Security #
- RPA and IPA - Strategy and Management #
- Secure Software Development Lifecycle for Agile #
- Securing IoT
- Professional Certificate in Digital Agility & Change Leadership #
- Professional Certificate in Digital Business Strategy #
- Professional Certificate in Digital Organisation Models #
- Professional Certificate in Innovation by Design #
- Professional Certificate in Mastering Digital Architecture #
- Professional Certificate in Managing Digitalisation Complexity #
- Professional Certificate in Strategic Thinking & Digital Foresight #
- Professional Certificate in Talent & Leadership Pathways #

Artificial Intelligence

- AI and Cybersecurity
- Autonomous Robots and Vehicles #
- Cognitive Systems #
- Conversational UIs #
- Human-Robot System Engineering #
- Intelligent Process Automation #
- Intelligent Sensing and Sense Making #
- Machine Reasoning #
- New Media and Sentiment Mining #
- Pattern Recognition and Machine Learning Systems #
- Problem Solving using Pattern Recognition #
- Real Time Audio-Visual Sensing and Sense Making #
- Reasoning Systems #
- Robotic Systems #
- RPA and IPA - Strategy and Management #
- Self- Learning Systems #
- Software Robots - Best Practices #
- Spatial Reasoning from Sensor Data #
- Text Analytics #
- Text Processing using Machine Learning #
- Visions Systems #

Digital Innovation & Design

- Digital & Social Engagement Strategy
- Digital User Experience Design
- Innovation Bootcamp
- Service Design #
- Social Media Analytics
- Web Analytics & SEO

Stackable Programmes

www.iss.nus.edu.sg

Updated as of 1 Dec 2020

GRADUATE PROGRAMMES

MASTER OF TECHNOLOGY IN ENTERPRISE BUSINESS ANALYTICS (MTECH EBAC)

Achieve improved business outcomes through data insights

- Management of Business Analytics Project
- Business Analytics Practice
- Customer Analytics
- Big Data Engineering and Web Analytics
- Specialized Predictive Modeling and Forecasting
- Practical Language Processing

Learning Outcomes

- Help enterprises move towards a stronger emphasis on computer tools and statistical and machine learning techniques to develop high-performance analytics capability
- Translate massive and complex unstructured data (e.g.: text) into insights
- Produce predictive models to solve a broad range of problems across various business functions and units
- Contribute to the development of more effective business strategies and plans for sustainable growth and competitive advantage

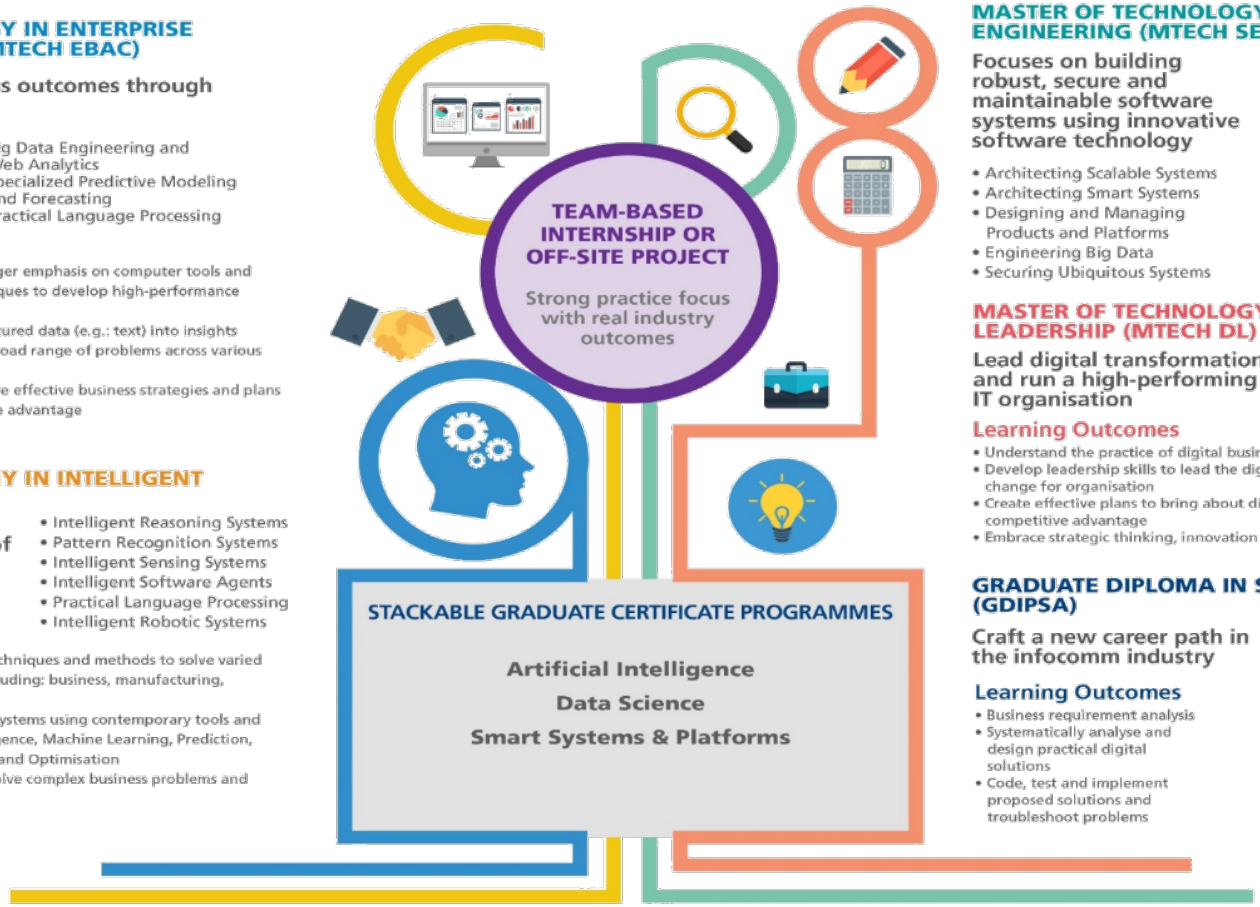
MASTER OF TECHNOLOGY IN INTELLIGENT SYSTEMS (MTECH IS)

Emphasises the concepts, techniques and methods of Intelligent Systems and their applications

- Intelligent Reasoning Systems
- Pattern Recognition Systems
- Intelligent Sensing Systems
- Intelligent Software Agents
- Practical Language Processing
- Intelligent Robotic Systems

Learning Outcomes

- Apply Intelligent Systems concepts, techniques and methods to solve varied problems across multiple domains including: business, manufacturing, engineering, heathcare etc.
- Lead the development of Intelligent Systems using contemporary tools and techniques, including Artificial Intelligence, Machine Learning, Prediction, Forecasting, Classification, Clustering and Optimisation
- Design and customise algorithms to solve complex business problems and create strategic advantage



MASTER OF TECHNOLOGY IN SOFTWARE ENGINEERING (MTECH SE)

Focuses on building robust, secure and maintainable software systems using innovative software technology

- Architecting Scalable Systems
- Architecting Smart Systems
- Designing and Managing Products and Platforms
- Engineering Big Data
- Securing Ubiquitous Systems

Learning Outcomes

- Become software architects capable of architecting and designing systems that exploit major contemporary software platforms, technologies and methodologies
- Become software architects capable of architecting and designing smart and secure systems
- Become data architects equipped with data engineering skills to engineer big data from a variety of sources

MASTER OF TECHNOLOGY IN DIGITAL LEADERSHIP (MTECH DL)

Lead digital transformation and run a high-performing IT organisation

- Practice of Digital Business
- Digital Transformation
- Digital Leadership & People

Learning Outcomes

- Understand the practice of digital business models
- Develop leadership skills to lead the digital journey and drive breakthrough change for organisation
- Create effective plans to bring about digital transformation in the business for competitive advantage
- Embrace strategic thinking, innovation and effective communication

GRADUATE DIPLOMA IN SYSTEMS ANALYSIS (GDIPSA)

Craft a new career path in the infocomm industry

Learning Outcomes

- Business requirement analysis
- Systematically analyse and design practical digital solutions
- Code, test and implement proposed solutions and troubleshoot problems

- Methodology
- Technology
- Databases
- Programming - C# Suite
- Programming - Java Suite
- Programming - Python Suite
- Full stack Solution Development
- Android Application Development
- Project Management
- Mobile Solution Development

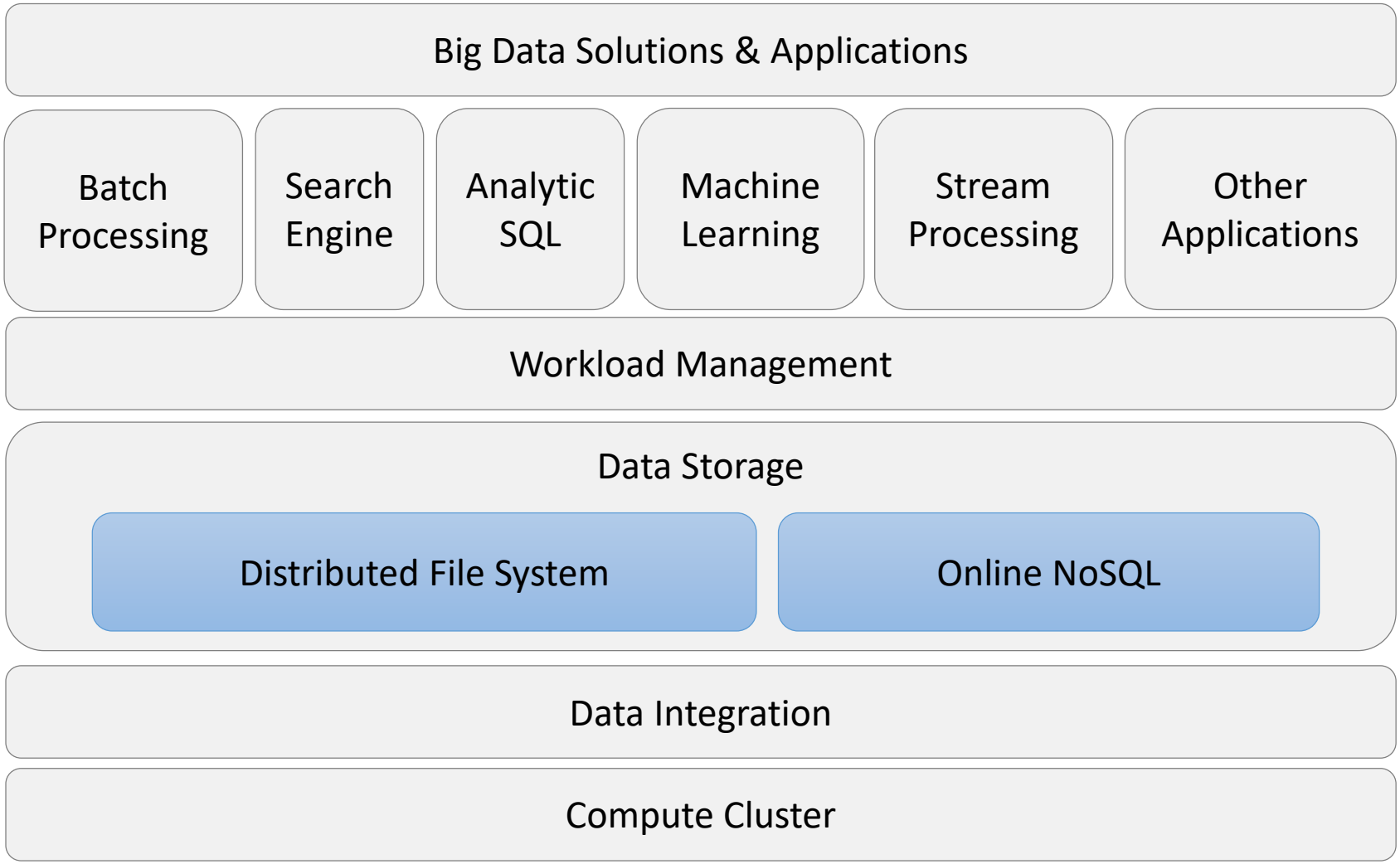
Course Introduction

- This course will teach the participants to **engineer Big Data solutions** on a distributed computing platform.
- The key motivation is to provide the participants with **necessary engineering skills** to deal with a range of real world Big Data solutions.
  - This will be achieved by constructing an **architectural framework for big data storage and processing,** using appropriate languages to manage polyglot programming/ scripting / persistence.
  - Construction will foster implementation of the best fitting analytics model for the given requirements.
- Illustrate the above discussed implementation processes using **Spark Framework**.

Learning Objectives

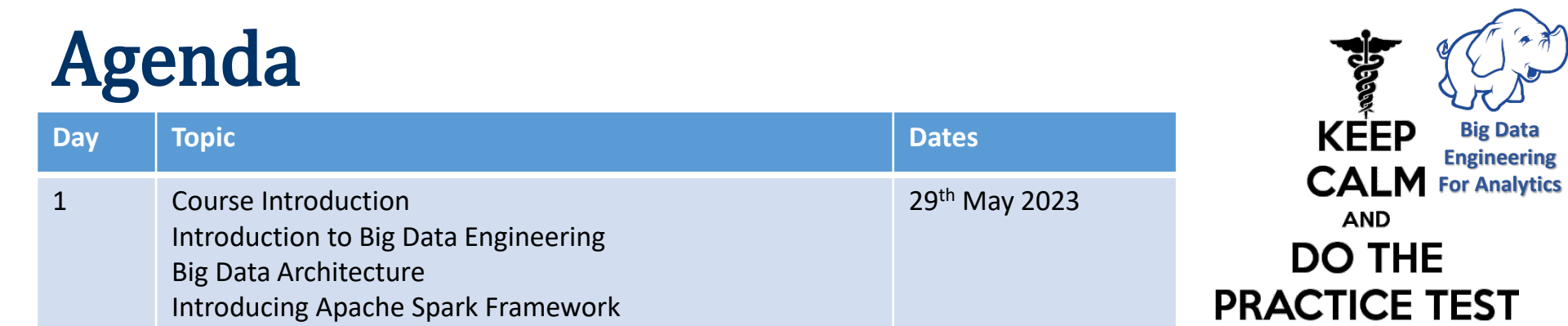
1. Understand the growth of **Big Data** and need for a **scalable processing** framework.
2. Understand the various **data storage options**, choose an appropriate storage model based on the application requirements.
3. Perform data manipulation and querying on Big Data solutions dealing with high volume using **NoSQL**.
4. Understand the big data computing essentials, storage needs, and relevant architectural mechanism in processing both structured and unstructured data.
5. Understand various in memory, batch processing and Spark query engine to perform analytics .
6. Understand and use the **rdd, data frame, machine learning, statistics** and other related packages that come with **Spark**.

Course Design



Agenda

Day	Topic	Dates
1	Course Introduction Introduction to Big Data Engineering Big Data Architecture Introducing Apache Spark Framework Lab: Installation or Workshop Tools and Framework	29th May 2023
2	Functional Thinking and Programming Lab: Writing Scalable Functions in Python Workshop Big Data Ingestion Big Data Ingestion Tools	30th May 2023
3	Spark Query Language with Python and Scala Spark SQL Demo Lab: Spark SQL Workshop Spark and Kubernetes Deployment Introduction to Spark RDD Spark RDD Workshop	31st may 2023
4	Spark Data Formats Spark Best Practices Introduction to Machine Language Spark ML	5th June 2023
5	Spark ML Workshop Managing Big Data Projects Case Study and Closing Session Mock Exam	6th June 2023



Practicing the workshops and completing the mock exam helps!!!

Our Wish is that . . .

- You will be equipped to **engineer** from development of **Big Data Solutions** that targets solving **family of business analytics** problems.
- You will be the **change agents** who implements scale large scale data engineering solutions in the industry
- You will be solving such problems in your jobs by **employing sound distributed *Big Data Engineering* principles and design** instead of random approaches.

Dr. Venkat

Dr. Suria

Dr. Liu Fan

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