Minutes of the Board of studies in CSE & IT, Kakatiya University meeting held on 24/11/25 in online.

Members Attended:

S.No.	Name of the Teacher	Member	Signature
1.	Dr.T.Archana, Assistant Professor, Dept. of CSE.	BOS, Chairperson, CSE&IT	
2.	Prof.M.Sadanandam, Professor, Dept. of CSE, University College of Engineering, KU, Kothagudem	Member	
3.	Dr.N.Ramana, Associate Professor, Dept. of CSE, KU College of Engineering &Technology, KU, Warangal	Member	
4.	Dr.K.Kishor Kumar, Associate Professor Dept of CSE, University College of Engineering , KU, Kothagudem	Member	
5.	Smt. K.Sravanthi, Assistant Professor Dept. CSE, University College of Engineering, KU, Kothagudem	Member	
6.	Dr.K.Padmaja, Assistant Professor Dept. of CSE, University College of Engineering, KU, Kothagudem	Member	
7.	Dr. U.Venkanna, Associate Professor, Dept. of CSE, NIT, Warangal.	External Member	

1. Agenda Discussed
   a. B.Tech (Data Science), B.Tech(AI&ML) VIIIth Semester
      - Approval of Syllabus
2. Resolution:
   a. Approval of B.Tech (Data Science) VIIIth Semester Syllabus.
   b. Approval of B.Tech (AI & ML) VIIIth Semester Syllabus.

B.Tech
Data
Science
VIII
Semester
Syllabus

Faculty of Engineering & Technology
KAKATIYA UNIVERSITY, WARANGAL-506 009
Department of Computer Science &Engineering
Department of Information Technology

B. Tech. (DATA SCIENCE) VIII SEMESTER

S. No.	Course Code	Course Title	Scheme of Instruction			Lecture hrs/week	Scheme of Examination		Credits
			L	T	P	H	CIE	SEE	
1.	PE-V*	Professional Elective –V*	3	1	0	4	30	70	4
2.	PE-VI**	Professional Elective –VI**	3	1	0	4	30	70	4
3.	PCS-PW801DS	Project Work	0	0	6	6	50	100	3
4.	MC ***	Mandatory Non-Credit Course	2	0	0	2	30	--	0
		Total	**8**	**2**	**6**	**25**	**140**	**240**	11

***(PE-V)Professional Elective –V**

PE8501CS Cryptography and Network Security
PE8502CS Mobile Application Development
PE8503CS Web Security

****(PE-VI)Professional Elective –VI**

PE8601CS Block Chain Technology
PE8602CS Web and Social Media Analysis
PE8603CS Data Science Applications

*****(HS-MC) Mandatory Non Credit Course**

MC-802aHS Yoga Practice
MC-802bHS NSS

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B. Tech. (DATA SCIENCE) VIII SEMESTER

Professional Elective –V

PE8501CS –CRYPTOGRAPHY AND NETWORK SECURITY

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

UNIT I

Security Attacks: Interruption, Interception, Modification and Fabrication, Security Services: Confidentiality, Authentication, Integrity, Non-repudiation, Access Control and Security Mechanisms, A model for Network Security.

UNIT II

Conventional Encryption: Principles, Feistel Cipher Model, Conventional encryption algorithms (DES, RC4 and B1owfish, cipher block modes of operation, location of encryption devices, key distribution, Approaches of Message Authentication, Secure Hash Functions and HMAC.

UNIT III

Public key cryptography principles, Euclid's Algorithm, Fennat's and Euler's Theorem, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management: Kerberos, X.509 Directory Authentication Service.

UNIT IV

Email Security: Pretty Good Privacy (PGP) and S/MIME.
IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security, Associations and Key Management

UNIT V

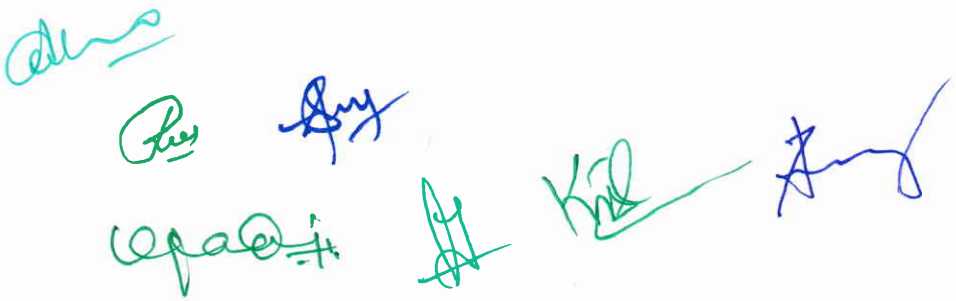
Web Security: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET). Intruders, Viruses and related threats, Firewall Design Principles, Trusted Systems, Intrusion Detection Systems.

TEXT BOOKS:

1 Cryptography and Network Security by William Stallings 5th Edition, Pearson Education.
2 Information Security, Principles and Practice by Mark Stamp, Wiley India.

REFERENCE BOOKS:

1 Applied Cryptography by Bruce Schneier, 2007.
2 Cryptography and Data Security, Denning D, Addison Wesley,1982.
3 Cryptography and Network Security : Forouzan, Mukhopadhyay, MC Graw Hill, 2"" Edition.



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B. Tech. (DATA SCIENCE) VIII SEMESTER

Professional Elective –V

PE8502CS –MOBILE APPLICATION DEVELOPMENT

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

UNIT I

Android Operating System: Android OS design and Features – Android development framework, SDK features, Installing and running applications on Eclipse platform, Creating AVDs, Types of Android applications, Best practices in Android programming, Android tools
Discussion on Android application components: Android Manifest file, Externalizing resources like values, themes, layouts, Menus etc, Resources for different devices and languages, Runtime Configuration Changes
What is Android Application Lifecycle: Activities, Activity lifecycle, activity states, monitoring state changes

UNIT II

How to Create Android User Interface: Measurements Device and pixel density independent Measuring units.
Layouts: Linear, Relative, Grid and Table Layouts.
Various components of User Interface (UI): Editable and non-editable Text Views, Buttons, Radio and Toggle Buttons, Checkboxes, Spinners, Dialog and pickers.
Event Handling: Handling clicks or changes of various UI components.
Fragments& Life cycle: Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities, Multi-screen Activities

UNIT III

Intents and Broadcasts: Intent – Using intents to launch Activities, Explicitly starting new Activity, Implicit Intents, Passing data to Intents, Getting results from Activities, Native Actions, using Intent to dial a number or to send SMS.
Broadcast Receivers and Notifications – Using Intent filters to service implicit Intents, Resolving Intent filters, finding and using Intents received within an Activity Notifications – Creating and Displaying notifications, Displaying Toasts

UNIT IV

Persistent Storage: Files, Saving state and Preferences– Using application specific folders and files, creating files, reading data from files, listing contents of a directory Shared Preferences – Creating shared preferences, saving and retrieving data using Shared Preference
Introducing Android Databases – Introduction to SQLite database, creating and opening a database, creating tables, inserting retrieving and deleting data, Registering Content Providers, Using content Providers (insert, delete, retrieve and update)

UNIT V

Advanced Topics: Alarms – Creating and using alarms.
Using Internet Resources – Connecting to internet resource, using download manager
Location Based Services – Finding Current Location and showing location on the Map, updating location.
Publishing Android Applications, Using Eclipse for Android Development, Using the Android Emulator

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TEXT BOOKS:

1 Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox) , 2012.
2 Android Application Development for Java Programmers, James C Sheusi, Cengage Learning, 2013.

REFERENCE BOOKS:

1 Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013.

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B. Tech. (DATA SCIENCE) VIII SEMESTER

Professional Elective –V

PE8503CS WEB SECURITY

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

UNIT I

The Web Security, The Web Security Problem, Risk Analysis and Best Practices.
Cryptography and the Web: Cryptography and Web Security, Working Cryptographic Systems and Protocols, Legal Restrictions on Cryptography, Digital Identification

UNIT II

The Web's War on Your Privacy, Privacy-Protecting Techniques, Backups and Antitheft, Web Server Security, Physical Security for Servers, Host Security for Servers, Securing Web Applications.

UNIT III

Database Security: Recent Advances in Access Control, Access Control Models for XML, Database Issues in Trust Management and Trust Negotiation, Security in Data Warehouses and OLAP Systems.

UNIT IV

Security Re-engineering for Databases: Concepts and Techniques, Database Watermarking for Copyright Protection, Trustworthy Records Retention, Damage Quarantine and Recovery in Data Processing Systems, Hippocratic Databases: Current Capabilities and Future Trends.

UNIT V

Privacy in Database Publishing: A Bayesian Perspective, Privacy-enhanced Location-based Access Control, Efficiently Enforcing the Security and Privacy Policies in a Mobile Environment.

TEXT BOOKS:

1 Web Security, Privacy and Commerce Simson G Arfinkel, Gene Spafford, O'Reilly.
2 Handbook on Database security applications and trends Michael Gertz, Sushil Jajodia

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B. Tech. (DATA SCIENCE) VIII SEMESTER

Professional Elective –VI

PE8601CS BLOCK CHAIN TECHNOLOGY

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

UNIT I

Block chain: The growth of block chain technology, Distributed systems, The history of block chain, Types of block chain
Consensus: Consensus mechanism, Types of consensus mechanisms, Consensus in block chain
Decentralization: Decentralization using block chain, Methods of decentralization, Routes to decentralization, Block chain and full ecosystem decentralization

UNIT II

Symmetric Cryptography: Working with the open SSL command line, Cryptography, Confidentiality, Integrity, Authentication, Non-repudiation, Accountability
Cryptographic Primitives: Keyless primitives, Symmetric cryptography, Data Encryption Standard(DES), Advanced Encryption Standard(AES).
Public Key Cryptography: Mathematics, Asymmetric cryptography, Cryptographic constructs and block chain technology.

UNIT III

Introducing Bitcoin: Bitcoin-an overview: The beginnings of bitcoin, Egalitarianism versus authorianism, Bitcoin definition, Bitcoin - A users perspective
Cryptographic keys: Private keys in bitcoin, Public keys in bitcoin, Addresses in bitcoin
Transactions: The transaction life cycle, The transaction data structure, Types of scripts, Coin base transactions, Transaction validation, Transaction bugs, Block chain, Mining, Mining pools

UNIT IV

Bitcoin Network and Payments: The Bitcoin Network, Wallets, Bitcoin Payments, Innovation in Bitcoin, Advanced protocols, Bitcoin investment and buying and selling.
Bitcoin Clients and APIs: Bitcoin client Installation, Experimenting further with bitcoin-cli, Bitcoin programming
Alternative Coins: Introducing altcoins, Theoritical foundations: Alternatives to proof of work (PoW), Proof of stake (PoS), Proof of activity (PoA), Non-out sourceable puzzles

UNIT V

Smart Contracts: Introduction, History, Ricardian contracts, Smart contract templates, Deploying smart contracts

Ethereum: Introduction, The ethereum network, Components of the ethereum ecosystem Transactions and messages, Ether cryptocurrency / tokens (ETC and ETH), The Ethereum Virtual Machine (EVM)

TEXT BOOKS:

1. Imran Bashir, "Mastering Block chain: Distributed ledger technology, decentralization, and smart contracts explained", 2nd ed. United Kingdom: Packt Publishing Limited, 2018.

REFERENCE BOOKS:

1. Narayanan A, Bonneau J, Felten E, Miller A, and Goldfeder S, Bitcoin and Cryptocurrency Technologies – A Comprehensive Introduction, 2nd ed., United States: Princeton University Press, 2016.
2. Andreas M. Antonopoulos, Mastering Bitcoin: Programming the Open Blockchain, 2nd ed., United States: O'Reilly Media, Inc., 2018.

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B. Tech. (DATA SCIENCE) VIII SEMESTER

Professional Elective –VI

PE8602CS WEB AND SOCIAL MEDIA ANALYSIS

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

UNIT I

An Overview of Business Intelligence, Analytics, and Decision Support: Analytics to Manage a Vaccine Supply Chain Effectively and Safely, Changing Business Environments and Computerized Decision Support, Information Systems Support for Decision Making, The Concept of Decision Support Systems (DSS), Business Analytics Overview, Brief Introduction to Big Data Analytics

UNIT II

Text Analytics and Text Mining: Machine Versus Men on Jeopardy!: The Story of Watson, Text Analytics and Text Mining Concepts and Definitions, Natural Language Processing, Text Mining Applications, Text Mining Process, Text Mining Tools.

UNIT III

Sentiment Analysis: Sentiment Analysis Overview, Sentiment Analysis Applications, Sentiment Analysis Process, Sentiment Analysis and Speech Analytics.

UNIT IV

Web Analytics, Web Mining: Security First Insurance Deepens Connection with Policyholders, Web Mining Overview, Web Content and Web Structure Mining, Search Engines, Search Engine Optimization, Web Usage Mining (Web Analytics), Web Analytics Maturity Model and Web Analytics Tools.

UNIT V

Social Analytics and Social Network Analysis: Social Analytics and Social Network Analysis, Social Media Definitions and Concepts, Social Media Analytics.
Prescriptive Analytics - Optimization and Multi-Criteria Systems: Multiple Goals, Sensitivity Analysis, What-If Analysis, and Goal Seeking.

TEXT BOOKS:

1 Ramesh Sharda, Dursun Delen, Efraim Turban, BUSINESS INTELLIGENCE AND ANALYTICS: SYSTEMS FOR DECISION SUPPORT, Pearson Education.

REFERENCE BOOKS:

1. Rajiv Sabherwal, Irma Becerra-Fernandez," Business Intelligence – Practice, Technologies and Management", John Wiley 2011.
2. Lariss T. Moss, ShakuAtre, "Business Intelligence Roadmap", Addison-Wesley It Service.
3. Yuli Vasiliev, "Oracle Business Intelligence: The Condensed Guide to Analysis and Reporting", SPD Shroff, 2012.

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B. Tech. (DATA SCIENCE) VIII SEMESTER

Professional Elective –VI

PE8603CS DATA SCIENCE APPLICATIONS

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

UNIT I

Introduction to Data Science and Data Analysis Workflow:
Definition and Scope of Data Science, Datafication and Big Data Ecosystem, Data Science Process (Problem → Data → Analysis → Model → Decision), Data Acquisition and Cleaning (CSV, JSON, APIs, Web Scraping), Exploratory Data Analysis (EDA), Descriptive Statistics, Data Visualization Techniques (Histogram, Boxplot, Correlation Maps), Python Libraries – NumPy, Pandas, Matplotlib, Seaborn, Data Wrangling, Data Summarization, Visualization Dashboards.
Applications: Market Trend Analysis, Weather Pattern Analytics, Student Performance Prediction.
Case Studies: RealDirect Data Analysis, COVID-19 Dataset Exploration.

UNIT II

Statistical Modeling and Supervised Learning:
Statistical Inference, Sampling and Estimation, Linear Regression and Multivariate Regression, Logistic Regression and Binary Classification, k-Nearest Neighbors (kNN), Naïve Bayes Classifier, Model Evaluation Metrics (Accuracy, Precision, Recall, F1-Score, ROC Curves), Cross-Validation and Hyperparameter Tuning, Model Deployment using Scikit-learn, Training and Testing Splits, Performance Evaluation Techniques.
Applications: Spam Email Detection, Credit Risk Scoring, Customer Purchase Prediction, Employee Attrition Analysis.
Case Studies: Spam Detection using Email Dataset, Loan Default Prediction using Bank Dataset.

UNIT III

Feature Engineering, Clustering, and Model Optimization:
Data Transformation and Feature Scaling, Feature Selection Techniques (Filter, Wrapper, Embedded), Dimensionality Reduction (PCA, SVD), Decision Trees, Random Forests, Ensemble Learning, Clustering Techniques (k-Means, Hierarchical), Model Optimization and Regularization, Bias-Variance Tradeoff, Model Interpretability, Data Leakage and Overfitting, Model Explainability using SHAP or LIME, Feature Importance Evaluation.
Applications: Customer Segmentation, Fault Detection in Manufacturing, Sentiment Analysis, Healthcare Risk Grouping.
Case Studies: Customer Segmentation using Retail Dataset, Sentiment Analysis using Movie Reviews, Patient Health Risk Prediction.

UNIT IV

Data Products, Visualization, and Big Data Frameworks:
Recommendation Systems (Content-Based, Collaborative Filtering), Matrix Factorization (SVD, ALS), Advanced Data Visualization (Dashboards, Interactive Charts, Storytelling with Data), Data Engineering Concepts (Data Pipelines, ETL, Workflow Design), Big Data Tools and Frameworks (Hadoop, MapReduce, Pregel), Real-Time Data Analysis using PySpark, Fraud Detection Models, Risk Analytics, Deployment using Streamlit or Flask, Data Product Design and Scaling.
Applications: E-Commerce Product Recommendations, Financial Fraud Detection, Social Media Trend Visualization, Real-Time Analytics.
Case Studies: MovieLens Recommendation System, Square Risk Analytics, New York Times Data Visualization Projects.

UNIT V

Causality, Ethics, and Responsible AI:
Correlation vs. Causation, Causal Inference and Randomized Controlled Trials, A/B Testing and Experimental Design, Observational Studies and Confounding Variables, Social Network Analysis (Graph Representation, Centrality Measures), Ethical AI and Data Privacy, Fairness and Accountability in AI Systems, Algorithmic Bias Detection, Responsible AI Practices, Model Auditing and Transparency Tools, Legal and Societal Implications of Data Science.
Applications: Medical Treatment Effect Analysis, Website Optimization through A/B Testing, Social Network Influence Mapping, Ethical AI Design Frameworks.
Case Studies: COVID-19 Epidemiology Modeling, Facebook Social Graph Analysis, Data Journalism Projects from NY Times, Fairness Audit on Loan Approval Dataset.

TEXT BOOKS:

1 Rachel Schutt & Cathy O'Neil, Doing Data Science: Straight Talk from the Frontline, O'Reilly Media, 2013.

2 Wes McKinney, Python for Data Analysis, O'Reilly Media, 2nd Edition, 2018.

REFERENCE BOOKS:

1 Christopher Bishop, Pattern Recognition and Machine Learning, Springer.

2 Trevor Hastie, Robert Tibshirani & Jerome Friedman, The Elements of Statistical Learning, Springer.

3 Jake VanderPlas, Python Data Science Handbook, O'Reilly Media.

4 Andrew Gelman & Jennifer Hill, Data Analysis Using Regression and Multilevel Models, Cambridge University Press.

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B. Tech. (DATA SCIENCE) VIII SEMESTER

Humanity Science Course

MC802aHS –YOGA PRACTICE

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
2	0	0	0	---

UNIT I

Introduction: Yoga definition, health definition from WHO, yoga versus health, basis of yoga, yoga is beyond science, Gist of eighteen chapters of Bhagavad-Gita, four types of yoga: Karma, Bhakti, Gnyana and Raja yoga, Internal and External yoga, elements of Ashtanga yoga (Yama, Niyama, Asana, Pranayama, Prathyahara, Dharana, Dhyana and Samadhi), Pancha koshas and their purification through Asana, Pranayama and Dhyana.

UNIT II

Suryanamaskaras (Sun Salutations): Definition of sun salutations, seven chakras (Mooladhaar, Swadhishtaan, Manipura, Anahata, Vishuddhi, Agnya and Sahasrar), various manthras (Om Mitraya, OmRavaye, Om Suryaya, Om Bhanave, Om Marichaye, Om Khagaye, Om Pushne, Om Hiranya Garbhaye, Om Adhityaya, Om Savitre, Om Arkhaya, and Om Bhaskaraya) and their meaning while performing sun salutations, physiology, seven systems of human anatomy, significance of performing sun salutations.

UNIT III

Asanas (Postures): Pathanjali's definition of asana, sthiram sukham asanam, 3rd limb of Ashtanga yoga, loosening or warming up exercises, sequence of perform in asanas (standing, sitting, prone, supine and inverted), nomenclature of asanas (animals, trees, rishis and so on), asanas versus chakras, asanas versus systems, asanas versus physical health, activation of Annamaya kosha.

UNIT IV

Pranayama (Breathing Techniques): Definition of Pranayama as per Shankaracharya, 4th limb of Ashtanga yoga, various techniques of breathing, Pranayama techniques versus seasons, bandhas and their significance in Pranayama, mudras and their significance in Pranayama, restrictions of applying bandhas with reference to health disorders, Pranayama versus concentration, pranayama

is the bridge between mind and body, pranayam versus mental health, activation of Pranamaya kosha through Pranayama.

UNIT V

Dhyana (Meditation): Definition of meditation, 7th limb of Ashtanga yoga, types of mind (Conscious and Sub-Conscious), various types of dhyana. Meditation versus spiritual health, Dharana and Dhyana, extention of Dhyana to Samadhi, Dhyana and mental stress, activation of Manomaya kosha through dhyana, silencing the mind.

SUGGESTED READINGS:

1. Light on Yoga by BKS lyengar.
2. Yoga Education for Children, Vol-1 by Swami Satyananda Saraswati.
3. Light on Pranayama by BKS lyengar.
4. Asana Pranayama Mudra and Bandha by Swami Satyananda Saraswati.
5. Hatha Yoga Pradipika by Swami Mukhtibodhananda.
6. Yoga education for children, Vol-11 by Swami Niranjanananda Saraswati.
7. Dynamics of Yoga by Swami Satyananda Saraswati.

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B. Tech. (DATA SCIENCE) VIII SEMESTER

Humanity Science Course

MC802bHS –NSS

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
2	0	0	0	---

LIST OF ACTIVITIES

1. Orientation program about the role of NSS in societal development.
2. Swachh Bharat Program.
3. Guest lectures from eminent personalities on personality development.
4. Plantation of saplings/Haritha Haram Program.
5. Blood Donation / Blood Grouping Camp.
6. Imparting computer education to school children.
7. Creating Awareness among students on the importance of Digital transactions.
8. Stress management techniques.
9. Health Check-up Activities.
10. Observation of Important days like Voters' day, World Water Day and so on.
11. Road Safety Awareness Programs.
12. Energy Conservation Activities
13. Conducting Programs on effective communication skills.
14. Awareness programs on national integration.
15. Orientation on Improving Entrepreneurial Skills.
16. Developing Effective Leadership skills.
17. Job opportunity awareness programs in various defense, public sector undertakings.
18. Skill Development Program.
19. Creating awareness among students on the Importance of Yoga and other physical activities.
20. Creating awareness among students on various government sponsored social welfare schemes for the people.

Note: At least Ten Activities should be conducted in the Semester. Each event conducted under Swachh Bharat, Plantation and important days like Voters' day, world water day may be treated as a separate activity.