

PURBANCHAL UNIVERSITY

2025

Bachelor in Information Technology (B.I.T.)/Seventh Semester/*Final*

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

BIT402CO: Digital Governance (*New Course*)

Candidates are required to give their answers in their own words as far as practicable. Figure in the margin indicate full marks.

Group A

Answer TWO questions.

2×12=24

1. Explain the different stages of e-Government development with relevant e-Government projects of each corresponding maturity level in Nepal.
2. What is citizen centricity? Explain the roles of citizen relationship management on digital governance. Discuss any relevant citizen engagement example of Nepal towards government modernization.
3. What is e-governance readiness? Discuss e-readiness framework with their steps.

Group B

Answer SEVEN questions.

7×8=56

4. What is security standard? Discuss different securities standards.
5. Discuss the different issues of PPP model for e-government. Explain the merits and demerits of this model.
6. What are different ICT infrastructures for e-Government? Explain the roles of computing infrastructure and interoperability frameworks for efficient e-Government operations.
7. What are common challenges of e-Government security? Explain.
8. What are different phases of e-government system lifecycle? Explain the different activities performed on system implementation and beyond phase.
9. What is Digital Democracy? Explain how Internet has been used to increase political participation.
10. What is AI Bias? Explain the common indicators using AI for measuring performances with its benefits.
12. Write short notes on Any TWO:
(a) User Environment Security (b) Secure Digital Elections
(c) Data centers

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Time: 03:00 hrs.

Full Marks: 80 / Pass Marks: 32

BIT422CO: Business Intelligence and Data Science (Specialization-III)

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Group A

Answer TWO questions.

2×12=24

1. Define BI. Explain the Business-Response-Support Model. Briefly describe the major components of BI. 1+5+6
2. Define Data Mining. What are its characteristics? Explain various DM processed methods, including the role of software tools like WEKA. 2+4+6
3. Define Cloud Computing, PaaS, SaaS and IaaS. Identify nine clusters in analytics Ecosystem and explain any two of them. 6+6

Group B

Answer SEVEN questions.

7×8=56

4. Define Analytics. Explain the steps of intelligence creation and use. 2+6
5. Explain the concept of extraction, transformation and load (ETL) processes in detail within the context of data warehousing.
6. Define a report. What are the main characteristics of a good business report? What are the main differences between line, bar, and pie chart? 2+3+3
7. Compare Balanced Score Card and Sig Sigma as a performance management system
8. Describe the various components of business performance management (BPM). How do business reporting, visual analytics and performance measurement systems contribute to effective BPM? 4+4
9. Explain any four text mining applications.
10. Explain the concept of DM privacy issues. How can text mining, specifically sentiment analysis, contribute to understanding customer opinions? 4+4
11. Define Web 2.0. What are the critical success factors of Big Data Analytics? 2+6

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Bachelor in Information Technology (B.I.T.)/Seventh Semester/Final

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

BIT421CO: Machine Learning (Specialization-I)

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Group A

Answer TWO questions.

2×12=24

1. Discuss various components involved in designing a complete machine learning system. Explain different models used in machine learning.
2. Provide a comprehensive overview of the text mining process. Elaborate on different stages involved including text preprocessing, text assembly and text exploration.
3. Describe the differences between bias and variance. How can overfitting and underfitting be addressed in machine learning models? Provide examples.

Group B

Answer SEVEN questions.

7×8=56

4. Define and explain K-means clustering. What are the advantages and limitations of this algorithm in unsupervised learning?
5. How does a decision tree handle classification problem? Briefly explain the concept of inductive bias in decision tree learning.
6. Explain the concept of model evaluation, specifically focusing on metrics like accuracy, precision, recall, and F1 score. When would you prioritize one metric over another?
7. What is a Convolutional Neural Network (CNN), and how is it different from a traditional neural network? Discuss its key applications.
8. What is the primary role of back propagation in feed forward neural networks? Explain with suitable illustration.
9. Differentiate between Logistic Regression and Support Vector Machines (SVM) in classification tasks. Discuss scenarios where one may be favored over the other.

Cont. ...

(2)

10. Explain what is K-Fold Cross-Validation and its importance in assessing the performance of machine learning models. Provide an example to show its implementation in Python.
11. Write short notes of Any TWO:
 - (a) Dataset
 - (b) Collaborative filtering
 - (c) Regularization

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Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

BIT401CO: Network Programming (New)

Candidates are required to give their answers in their own words as far as practicable. Figure in the margin indicate full marks.

Group A

Answer TWO questions.

2×12=24

1. ✗ Write down chat program using UDP socket. 6+6
2. Explain in brief about elementary TCP socket with diagram.
3. What is Daemon process? Explain steps performed by inetd. ✗

Group B

Answer SEVEN questions.

7×8=56

4. What is IPC? Compare pipe () with FIFO ().
5. ✗ Define Multiplexing. Why Multiplexing is used in network programming? Explain blocking and non-blocking I/O Multiplexing models.
6. What are process and program? Explain fork () and uname () system call with program.
7. ✗ Explain network byte ordering and host byte ordering functions in brief.
8. ✗ Explain any three IPV4, IPV6 and TCP Socket Options.
9. ✗ Describe the need of RAW socket. Explain input and output Raw Socket.
10. ✗ What is socket address? Explain IPV4 and IPV6 socket address structure.
11. Explain TCP Connection establishment steps with diagram.

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BIT401CO: Network Programming (New)

Candidates are required to give their answers in their own words as far as practicable. Figure in the margin indicate full marks.

Group A

Answer TWO questions.

2×12=24

1. ✗ Write down chat program using UDP socket. 6+6
2. Explain in brief about elementary TCP socket with diagram.
3. What is Daemon process? Explain steps performed by inetd. ✗

Group B

Answer SEVEN questions.

7×8=56

4. What is IPC? Compare pipe () with FIFO ().
- ✗ 5. Define Multiplexing. Why Multiplexing is used in network programming? Explain blocking and non-blocking I/O Multiplexing models.
6. What are process and program? Explain fork () and uname () system call with program.
- ✗ 7. Explain network byte ordering and host byte ordering functions in brief.
- ✗ 8. Explain any three IPV4, IPV6 and TCP Socket Options.
- ✗ 9. Describe the need of RAW socket. Explain input and output Raw Socket.
- ✗ 10. What is socket address? Explain IPV4 and IPV6 socket address structure.
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Time: 03:00 hrs.

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BIT421CO: Machine Learning (Specialization-1)

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Group A

Answer TWO questions.

2×12=24

1. List the different types of learning models in machine learning. Discuss at least three types with their characteristics and applications.
2. Explain the concept of supervised learning. Compare and contrast linear regression and logistic regression in terms of their applications, underlying assumptions, and evaluation metrics.
3. What is model tuning, and why is it important in machine learning? Discuss the concepts of bias and variance, and describe K-Fold cross-validation as a method for model evaluation.

Group B

Answer SEVEN questions.

7×8=56

4. Explain the concept of decision trees in machine learning. What are the advantages and disadvantages of using decision trees for classification?
5. Define and discuss K-means clustering. Describe its applications.
6. What is an Artificial Neural Network, and what are its key components? Explain.
7. Describe the architecture of a feed-forward neural network.
8. Describe some real-world applications of deep learning in different industries.
9. Discuss the text mining process. What are the key steps involved in text preprocessing?
10. What is Random Forest, and how does it improve upon basic decision tree algorithms?
11. Write short notes of Any TWO:
(a) Inductive bias learning (b) Reinforcement learning (c) Overfitting

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Time: 03:00 hrs.

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BIT423CO: Deep Learning (Specialization-II)

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Group A

Answer TWO questions.

2×12=24

1. Describe the layers of convolutional neural networks (CNNs). Why are CNNs particularly well-suited for image-related tasks?
2. What are the challenges of training deep neural networks (DNNs)? Discuss about any two optimizers that can be used to improve training efficiency.
3. Explain the architecture and functionality of restrictive Boltzmann Machines (RBMs).

Group B

Answer SEVEN questions.

7×8=56

4. What are the key differences between feed-forward neural networks and recurrent neural networks?
5. How are deep neural networks (DNNs) used in speech processing and NLP?
6. What are generative models, and how do they differ from discriminative models in machine learning?
7. Describe the VGG architecture and its contributions to deep learning.
8. What is batch normalization, and why is it important in training neural networks?
9. Explain the role of the activation function in artificial neurons.
10. What advantages do Gated RNN architectures offer over traditional RNNs?
11. Write short notes on Any TWO: 2×4=8
 - (a) Back propagation
 - (b) Perceptron
 - (c) Belief nets

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Bachelor in Information Technology (B.I.T.)/Seventh Semester/Final

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

BIT401CO/BIT474CO/BIT411CS: Network Programming (New/Old)

Candidates are required to give their answers in their own words as far as practicable. Figure in the margin indicate full marks.

Group A

Answer TWO questions.

2×12=24

1. Write a UDP client-server program to perform simple message transfer.
2. What are various modes of I/O in UNIX? Explain about *select* and *poll* functions. How is *select* different from *pselect*? 4+4+4
3. Draw the TCP client-server functional diagram and describe each unit. What happens if the value of backlog is left zero in the *listen* function? What happens if the connection cannot be setup immediately by the server in response to connect? 8+2+2

Group B

Answer SEVEN questions.

7×8=56

4. Explain IPC using FTFO with syntax.
5. Explain how name servers work. What is a Resource Record? Write a program to find the name of the host using the *uname* function. 2+2+4
6. What is a Unix Domain Socket? Why is it useful? Write the syntax to create Unix Domain stream and UNIX Domain datagram socket. 2+2+4
7. Why are socket options necessary? Explain in detail about *SOCK_LINGER* and *TCP_NODELAY* options. 2+6
8. Explain daemon process. Describe *syslog* function and *syslogd*.
9. Why is TCP connection establishment called TCP three-way handshaking? Describe TCP *TIME_WAIT* state with a suitable figure. 4+4

Contd. ...

10. What are little endian and big endian formats? Explain about byte ordering functions. 2+6
11. What is a RAW socket and how is it created? What are the inputs and outputs of RAW socket? 4+4
12. Write short notes on Any TWO: 4+4
- (a) Multicasting, Unicasting vs Broadcasting
 - (b) Exec family calls
 - (c) Wrapper function

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BIT402CO: Digital Governance (*New Course*)

Candidates are required to give their answers in their own words as far as practicable. Figure in the margin indicate full marks.

Group A

Answer TWO questions.

2×12=24

1. What is e-Governance? Differentiate it with e-Government. Discuss different benefits of e-Government. 2+4+6
2. Discuss different challenges of e-Government security and explain the e-Government security architecture. 6+6
3. What is digital democracy? How Internet helps to increase political participation? Discuss the protecting mechanism of democracy. 2+5+5

Group B

Answer SEVEN questions.

7×8=56

4. What is PPP Model? Explain the issues of PPP for e-Government.
5. What is ICT? Describe e-government architecture.
6. What is e-Government readiness? Discuss e-readiness framework.
7. Describe the different factors for designing new e-Government system.
8. Discuss and differentiate between online service delivery electronic service delivery.
9. What is data center? Discuss different data centers with examples.
10. What is risk mitigation in e-Government system? Discuss different risk mitigation strategies.
11. Describe the different components of an e-Government hybrid system.
12. Write short notes on Any TWO:
 - (a) GIDC
 - (b) Human Resource Management Software in Nepal
 - (c) Recent technologies of ICT

