

Master of Computer Applications (Two Year Programme)
MCA SECOND SEMESTER

680211 Software Engineering (DC-4)

Course outcome focused on employability/ entrepreneurship/ skill development

S.No.	Course Outcomes	Mapping
1.	Design and map different real world problems using software engineering concepts	Entrepreneurshipdevelopment
2.	Evaluate software models with respect to their accuracy and needs of the customer requirement.	Skill development
3.	Design test cases and SQA of a software system.	Employabilitydevelopment
4.	Identify how to use various cost estimation techniques used in software engineering.	Skill development
5.	Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	Employabilitydevelopment
6.	Evaluate time, processes and resources effectively by prioritizing competing demands to achieve personal and team goals	Skill development

UNIT - I Introduction to Software Engineering:

Definition, Software Characteristics and Elements of system, The System Development Life Cycle, The Role of System Analyst. Types of Requirement- Functional and Non-functional Requirements, User and System Requirements, Requirement Elicitation Methods, Requirement Analysis Methods, Requirement Documentation (SRS), Requirement Validation, Requirement Management.

UNIT - II Software Process Models:

Software, Software Myths, Software Engineering - A Layered Technology, Software Process Models, The Linear Sequential Model, The Prototyping Model, The RAD Model, Evolutionary Software Process Models, Fourth Generation Techniques

UNIT - III Design Concept, Principle and Methods:

Design Fundamentals, Design Principles, Effective Modular Design, Design Representations, Real Time Design, Object Oriented Design, Coupling and Cohesion, Risk analysis.

UNIT - IV Software Metrics, Project Management and Estimation:

Metrics in Process and Project domains, Software Measurement, Software Quality Metrics, **Project Management-** Basics-People, Product, Process, Project, **Estimation-** Software Project Estimation, Decomposition Techniques- Function Point Estimation, Line of Code (LOC) based estimation, Empirical Estimation, COCOMO Model, Project Scheduling Techniques

UNIT - V Software Quality Assurance and Testing:

Definitions, Quality Concepts, Software Quality Assurance, Software Reviews, Formal Technical Reviews, Formal Approaches to SQA, Software Testing Life Cycle (STLC), Test Case Design, Strategic Approach to Software Testing- Verification & Validation, Strategic issues, Criteria for completion of Testing, Unit Testing, Integration Testing, Validation Testing, System Testing, Black Box Testing Techniques, White Box Testing Techniques, Acceptance Testing

RECOMMENDED BOOKS

- Software Engineering by Sommerville, Pearson
 - Software Engineering, A Practitioner's Approach, by Roger S. Pressman, McGrawHill
 - Software Engineering by K.K. Agrawal & Yogesh Singh, New Publication
 - Software Engineering by Rajib Mall
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680212 Internet of things (DC-5)

Course outcome focused on employability/ entrepreneurship/ skill development

S.No.	Course Outcomes	Mapping
1.	Define fundamentals of IoT, Enabling Technologies, Networking and Communication Protocols.	Skill development
2.	Illustrate the functions, applications of various IOT Protocols and architectures.	Skill development
3.	Apply networking knowledge in Domain Specific IOTs for societal benefits	Employabilitydevelopment
4.	Discover technologies and theories involved in Sensor Networks, Machine-to-Machine Communications & Arduino Programming.	Entrepreneurshipdevelopment
5.	Evaluate the role of Security and privacy in the internet of things to provide solutions related to reliability and privacy for real world problems.	Entrepreneurshipdevelopment
6.	Develop IOT design methodologies using Python constructs and Raspberry Pi.	Employabilitydevelopment

Unit I

Introduction & Concepts: Introduction to Internet of Things, Architecture, Physical Design of IOT, Logical Design of IOT, Four Pillars of IoT, Applications, IOT Enabling Technologies, IOT components. Basics of Networking.

Unit II

Sensors, actuators, types of sensors. IOT service oriented Architecture, IOT associated technologies, IOT Communication Protocols: IEEE 802.15.4, Zigbee, 6LoWPAN, Wireless Hart, AMQP, MQTT, COAP, NFC, XMPP, SOAP, REST, HTTP Routing protocols.

Unit III

Developing Internet of Things & Logical Design using Python: Introduction, IOT Design Methodology, Installing Python, Python Data Types & Data Structures, Control Flow, Functions, Modules, Packages, File Handling, Date/ Time Operations, Classes, Introduction to Raspberry Pi, Introduction to Arduino Programming, Integration of Sensors and Actuators with Arduino, Raspberry Pi & arduino devices.

Unit IV

Sensor Networks, Ubiquitous Computing, data storage in IOT, IOT Cloud Based Services. Interoperability in IoT, cloud Computing, Fog Computing, Edge computing. Data Analytics overview.

Unit V

Security and privacy in the internet of things: concepts, IoT security overview, security framework for IoT, Privacy in IOT networks, IoT Robustness and reliability, Governing internet of things: issues, Approaches and new paradigms. IOT Case studies. : Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health & Life Style.

Reference Books:

1. Rajkamal, "Internet of Things", Tata McGraw Hill publication
2. Vijay Madiseti and Arshdeep Bahga, "Internet of things (A-Hand-on-Approach)" 1st Edition, Universal Press
3. Hakima Chaouchi "The Internet of Things: Connecting Objects", Wiley publication.
4. Charles Bell "MySQL for the Internet of things", Apress publications.
5. Francis dacosta "Rethinking the Internet of things: A scalable Approach to connecting everything", 1st edition, Apress publications 2013.
6. Donald Norris "The Internet of Things: Do-It-Yourself at Home Projects for Arduino, Raspberry Pi and BeagleBone Black", McGraw Hill publication.

Computer Networks 680213

Course outcome focused on employability/ entrepreneurship/ skill development

S.No.	Course Outcomes	Mapping
1.	Describe various data communication techniques, OSI reference model, the TCP/IP reference model and other basics in data communication and networking .(Understanding)	Skill development
2.	Discuss some medium access protocols (like, Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD etc) ,some modern topics (like ISDN services, ATM) (Understanding)	Skill development
3.	Examine various multiplexing techniques, error detection & correction methods, flow control methods and other concepts of computer networks to achieve required networking results as per standards. (Analyzing)	Employability development
4.	Illustrate different types of network devices and their functions within a network, Internetworking devices, Routing concepts, techniques and protocols and other concepts of computer networks (Applying)	Entrepreneurship development
5.	Evaluate various congestion prevention, avoidance and control mechanisms and other concepts of computer networks (Evaluation)	Entrepreneurship development
6.	Justify the use of cryptography, security and networking techniques and other concepts of computer networks for providing better network/applications in society. (Evaluation)	Employability development

UNIT-I

Introduction: Layered Networks Architecture, Review of ISO-OSI model, Data Communication techniques pulse code modulation (PCM) Differential Pulse Code Modulation (DPCM), Delta Modulation (DM), transmission media wires cables, radio links, satellite links, fiber-optic links, error detection, parity check codes, cyclic redundancy codes, & Hamming code.

UNIT-II

Multiplexing and DLC Preliminaries:

Multiplexing techniques Frequency division, time division, statistical time division multiplexing, multiplexing hierarchies,

DLC Preliminaries: Stop and wait protocols: Noise free and noisy channels, performance and efficiency, sliding window protocols: Go back and selective repeat.

UNIT III

Data Link Protocols:

HDLC data link protocol, Integrated services digital networks; interfaces, Devices, Channel structure, Asynchronous transfer mode (ATM) cells, header and cell formats, Layers in ATM, Class 1,2,3,4 traffic.

FDDI, Multiple access protocols: Concept of random access Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, FDMA, TDMA, CDMA;

UNIT-IV

Network Layer Protocols: Design Issues : Virtual Circuits and Datagram, Internetworking & devices: Repeaters, Hubs, Bridges, Switches, Router, Gateway; Addressing : Internet address, classful address, subnetting; Routing : techniques, static vs. dynamic routing , routing table for classful address; Routing algorithms: Optimality principle, Shortest path routing – Dijkstra, bellman-ford and floydwarshall algorithms, flooding and broadcasting, distance vector routing, link state routing, flow based routing, multicasting, routing.

UNIT-V

Transport Layer Protocols and Congestion Control: General principles of congestion control, window flow control, packet discarding, Isarithmic control, traffic shaping, choke packets Leaky bucket algorithm, Token bucket algorithm, choke packets; Connection Management, Addressing,

Connection Establishment and releases, flow control and buffering, multiplexing, crash recovery in TCP.

Presentation and Application Layer Protocols: Presentation concepts, Cryptography: Substitution and transposition, ciphers, data encryption standard (DES), DES chaining, breaking DAS, public key cryptography, RSA , authentication protocols.

Books:

- 1.A.S. Tanenbaum, “Computer Networks”, Second Ed., Prentice Hall India(tan).
- 2.J.F.Hayes, “Modeling and Analysis of Computer Communication Networks”, Plenum press.
- 3.D.Bertsekas and R. Gallager, “Data Networks”, Second Ed. Prentice Hall, India.
- 4.D.E. Comer, “Internetworking with TCP/IP”, vol. 1, prentice Hall India.
- 5.G.E. Keiser, “Local Area Networks”, McGraw Hill, international Ed.
- 6.W. Stalling, “Data & Computer Communications”, Maxwell Macmillan international Ed.

680218 Managerial Economics (DE-II (BM))

Course outcome focused on employability/ entrepreneurship/ skill development

S.No.	Course Outcomes	Mapping
1.	Understand the economic basis for business characteristics and market imperfections	Skill development
2.	Differentiate between consumer behaviour and market behaviour	Skill development
3.	Distinguish the importance of costing, pricing and its relation with demand and supply.	Employability development
4.	Learn in detail the creation and sustainability of different markets.	Entrepreneurship development
5.	Apply optimizing techniques in competitive strategy in different markets	Entrepreneurship development
6.		

UNIT-I

Meaning, nature and scope of managerial economics, difference and similarities between micro-economics and macro-economics, objectives of firm, Profit maximization theory alternative theories and behavioral theories of the firm.

UNIT-II

Economic Principles, concepts of opportunity cost , marginal cost, incremental, time perspective, principles of discounting and equi-margin.

UNIT-III

Consumer behaviour-demand analysis purpose and concepts of demand, doctrine of diminishing utility, elasticity of demand, price elasticity, income elasticity and cross elasticity, demand forecasting.

UNIT-IV

Product and cost analysis: short run and long run average cost curves. Law of supply, economies and diseconomies of scale, law of variable proportions. Production functions: single output isoquants.

UNIT-V

Pricing: prescriptive approach, price determination under perfect competition, monopoly, oligopoly and monopolistic competition, methods of pricing, pricing strategies. Profits: nature and measurement policy, break even analysis, case study.

Books

1. Dean J. Managerial Economics PHI, NewDelhi
2. Mote V.L. et al Management Economics Concepts and Cases TMH, NewDelhi

680219 Corporate Planning (DE-II (BM))

Course outcome focused on employability/ entrepreneurship/ skill development

S.No.	Course Outcomes	Mapping
1.	Describe major theories, background work, concepts and research output in the field of strategic management.	Skill development
2.	Demonstrate a clear understanding of the concepts, tools & techniques used by executives in developing and executing strategies and will appreciate its integrative and interdisciplinary nature.	Skill development
3.	Reflect effective application of concepts, tools & techniques to practical situations for diagnosing and solving organizational problems.	Employability development
4.	Make their own decisions in a dynamic business landscape.	Entrepreneurship development
5.	Develop their capacity to think and execute strategically	Entrepreneurship development
6.	Select and apply current technologies to support an organization's integrative trade initiatives.	Employability development

Unit 1: Introduction to Strategies: Introduction, Fundamentals of Strategy, Conceptual Evolution of Strategy, Scope and Importance of Strategies, Purpose of Business, Difference between Goals and Objectives of Business, Strategic Intent through Vision and Mission Statements, Core Competencies of Business

Strategic Management: Introduction, Strategic Management, Need, scope, key features and importance of strategic management, Role of Strategists in Decision Making, strategists at various management levels, Types of Strategies, Limitations of Strategic Management

Unit 2: Strategy Analysis: Introduction, Strategy Analysis and its Importance, Environmental Appraisal and Scanning Techniques, Organisational Position and Strategic Advantage Profile, Strategic Management Model

Strategy Formulation and Implementation: Introduction, Strategy Formulation, Process in Strategy Formulation, Strategy Implementation and its Stages, Reasons for Strategy Failure and Methods to Overcome, Strategy Leadership and Strategy Implementation, Strategic Business Units (SBUs)

Unit 3: Strategic Control and Evaluation: Introduction, Strategy Evaluation, Strategic Control, Difference Between Strategic Control and Operational Control, Concept of Synergy and its Meaning, Key Stakeholder's Expectations

Business Policies: Introduction, Overview of Business Policies, Importance of Business Policies, Definitions of Policy, Procedures, Process and Programmes, Types of Policies, Business Policy Statements, Corporate Culture

Unit 4: Strategies for Multinational Corporations: Introduction, Multinational Corporations (MNCs), Benefits of MNCs, Limitations of MNCs, Business Strategies of MNCs, Techniques Employed by MNCs to Manage Markets, MNC, TNC and Global Companies Strategic Alliances: Introduction, Strategic Alliances, Types of Strategic Alliances and Business Decisions, Problems Involved in Strategic Alliances

Unit 5: Role of Creativity and Innovation in Business: Introduction, Creativity, Innovation, Creating and Building Creative and Innovative Business Culture, Business Practices Adopted to Promote Creativity and Innovation, Importance of Creativity and Innovation in Business, Challenges Involved in Creativity and Innovation

Business Ethics and Corporate Social Responsibility : Introduction, Ethics and Values, Ethical Conduct and Unethical Conduct, Impact of Ethical Conduct, Corporate Social Responsibilities

(CSR), Business obligations, Social Audit and Corporate Governance

Books:

1. Business Policy - Azhar Kazmi- S. Chand & Co. New Delhi
2. Strategic Management: Concepts & Cases - Upendra Kachru, Excel Bppks.
3. Strategic Planning: Formulation of Corporate strategy - V.S. Ramaswamy, S. Namakumari - Macmillan Publishing House Ltd.
4. Management Policy & Strategic Management - R. M. Shivastava, Himalaya Publishing House, Mumbai.
5. Creating Excellence - Craig R. Hickman & Michael A. Silva - London Universal Book Stall, New Delhi.

680220 MIS Framework and Implementation (DE-II (BM))

Course outcome focused on employability/ entrepreneurship/ skill development

S.No.	Course Outcomes	Mapping
1.	Define fundamental concepts of MIS framework, elements, challenges encountered in implementation and role of MIS in decision making.	Skill development
2.	Summarize the organizational functions of various subsystems and issues involved in MIS.	Skill development
3.	Identify the need of MIS structure, hierarchy of Management activity and information system for strategic planning to provide benefits to business organizations.	Employability development
4.	Analyze various business/IT strategies and Business models to improve business systems using MIS.	Entrepreneurship development
5.	Evaluate the role of management of information quality in the MIS, implementation Challenges and System development process.	Employability development
6.	Develop business plans, strategies and models using MIS framework to find solutions for real world cases.	Entrepreneurship development

Unit I

An overview MIS definition of MIS, MIS as an evolving concept, MIS and other academic disciplines subsystems of an MIS, operating elements of an information system MIS support for decision making.

Unit II

Management information system structure based on management activity, hierarchy of Management activity, information systems for operation control, information system for management operation control, information system for strategic planning.

Unit III

Based on organizational function: sales and marketing subsystem, production subsystem logistics subsystem, personnel subsystem, financial and accounting subsystem, information processing subsystem, top management subsystem, synthesis of MIS structure, some issues in MIS.

Unit IV

Development of long range plans of the MIS, Ascertaining the class of information, Determining the information requirement, Development and implementation of the MIS, Management of information quality in the MIS, Organization for development of MIS, MIS development process model.

Unit V

Planning fundamentals (real world cases), Organizational planning, planning for competitive advantage, (SWOT Analysis), Business models and planning. Business/IT planning, identifying business/IT strategies, Implementation Challenges, Change management., Developing business systems, (real world case), SDLC, prototyping, System development process, implementing business system.

Books :

1. Gordan B. Davis and Margrethe H. Olson, Management Information Systems - Conceptual Foundation, Structure and Development, McGrawHill.
2. D. P. Goyal, Management Information Systems, McMillan E. M. Awad, system
3. System Analysis and Design, E. M. Awad

680221 Management of Software Projects (DE-II (BM))

Course outcome focused on employability/ entrepreneurship/ skill development

S.No.	Course Outcomes	Mapping
1.	Define fundamental concepts of software project management and related factors, activities, maintenance etc.	Skill development
2.	Demonstrate the role and need of risk management in software project management.	Skill development
3.	Apply the fundamental knowledge of Project Management to improve overall performance of software projects.	Employability development
4.	Analyze techniques of Project Scheduling and Project Monitoring & Controlling.	Entrepreneurship development
5.	Evaluate the role of Communication & Business technical reports and case tools in project management.	Employability development
6.	Develop project plan for software project by using guidelines of Software planning, structures, Planning Methods and Budgeting principles.	Entrepreneurship development

UNIT 1 – Overview of Project Management: Project Management – Definitions; Factors Influencing Project Management – Project Manager, Project Management Activities, Stakeholders; Project Communication; Project Development Phases; Project Charter; Statement of Work (SoW); Project Management Associations.

UNIT 2- Planning a Software Project: Project Plan, Step wise project planning; Selection of an appropriate project approach; Work Breakdown Structures (WBS); Planning Methods; Development Life Cycle Models; Software effort estimation: Software Cost Estimation; COCOMO Model.

UNIT 3- Project Scheduling: Scheduling Techniques – Program Evaluation and Review Technique (PERT), Gantt Chart, Critical Path Method (CPM).

Project Monitoring and Controlling: Project Tracking - Project Status Reporting; Milestone Analysis; Project Metrics; Project Communication Plan & Techniques; Steps for Process Improvement – collecting the data, visualizing progress, cost monitoring.

UNIT 4- Risk Management: Concepts of Risks and Risk Management; Risk Management Activities; Effective Risk Management; Risk Categories; Aids for Risk Identification; Potential Risk Treatments; Risk Components and Drivers; Risk Prioritization.

UNIT 5-Software Maintenance: Fundamental of software maintenance, types of software, strategies, and object oriented system design, improving software economics,

CASE tools and Environment: Concept, scope of CASE, classification of CASE tools, categories of CASE environment.

Communication & Business technical reports: Role of communication in s/w project management & its type's, principles of modern software management, Team management.

Books :

1. Software Project Management, A Unified Framework, Walker Royce.
2. Bob Hughes and Mike Cotterell “Software Project Management”, Third Edition, Tata Mcgraw-Hill
3. Software Project Management, Fifth Edition, Bob Hughes and Mike Cotterell.
4. Jalote Pankaj, Software Project Management In Practice, Pearson Education

680222 Organizational Behaviour (DE-II (BM))

Course outcome focused on employability/ entrepreneurship/ skill development

S.No.	Course Outcomes	Mapping
1.	Apply major theories, concepts, terms, models, frameworks and research findings in the field of organizational behavior in an Organizational setting.	Skill development
2.	Understand the implications of organizational behavior from the perspectives of employees, managers, leaders and the organization.	Skill development
3.	Analyze the role of individuals, groups, managers and leaders in influencing how people behave in organizational culture at large.	Entrepreneurship development
4.	Evaluate approaches to reorient individual, team, managerial and leadership behaviour in order to achieve organizational goals.	Employability development
5.	Elaborate the challenges in shaping organizational behavior, organizational culture and organizational change.	Entrepreneurship development
6.		

UNIT – I

Organizational Behavior Today: What is Organizational Behavior, shifting paradigms of organizational behavior, organizational behavior and diversity. Learning about Organizational Behavior: Organizational Behavior and learning imperative scientific Foundations of organizational behavior.

UNIT – II

Challenge and Opportunities for organizational behavior: Towards improving quality & productivity, improving people skills from management control to empowerment, from sterility of flexibility, Improving ethical behavior, organizational social responsibility work and quality of life.

UNIT- III

A Micro Perspective of Organizational Behavior: The perception process, personality and attitudes, motivation: motivating performance through job design and goal setting, learning: processes rewards systems and behavior management.

UNIT – IV

Micro and Macro Dynamics of Organizational Behavior: Group dynamics and teams, interactive conflict and negotiation skills, stress: cause effects and coping strategies, leadership styles, activities and skills. A Macro Perspective of Organizational Behavior: Communications, decision-making, Organizational Theory & Design, Organizational Culture.

UNIT – V

Horizons for Organizational Behavior: International Organizational Behavior (IOB), the impact of culture on IOB, Communication in IOB, motivation across culture, managerial leadership across cultures Organizational Change & Development: Learning objectives, the changes facing organizations, managing change and organizational development, future of organizational Behavior.

Books:

1. Fred Luthans “Organizational Behavior”, McGraw Hills international Edition, Management & Organization series.
2. Schermerhorn, Hunt & Osborn “Organizational Behavior” (7th Edition), John Wiley & Sons Inc.
3. Stephen P. Robbins “Organizational Behavior: Concepts controversies applications”, PHI

publications.

4.A.J.RobertsonLvan T. and Cooper, Cary.L. “Work Psychology Understanding Human Behavior in the workplace” Macmillan India Ltd. Delhi 1996.

5.M.N.Mishra“OrganizationalBehavior”,VikasPub.Co.

680223 Java Programming Lab (DLC-3)

Course outcome focused on employability/ entrepreneurship/ skill development

S.No.	Course Outcomes	Mapping
1.	Apply the principles and practice of object oriented analysis and design in the construction of robust, maintainable programs which satisfy their requirements.	Skill development
2.	Implement , compile, test and run Java programs comprising more than one class, to address a particular software problem.	Entrepreneurship development
3.	Demonstrate the ability to use simple data structures like arrays in a Java program.	Skill development
4.	Make use of members of classes found in the Java API (such as the Math class).	Employability development
5.	Demonstrate the ability to employ various types of selection constructs in a Java program.	Employability development
6.	Employ a hierarchy of Java classes to provide a solution to a given set of requirements.	Entrepreneurship development

Basics: Data types; Operators- precedence and associativity; Type conversion; decision making – if, if else, switch; loops – for, while, do...while; special statements–return, break, continue, labeled break, labeled continue; Modular programming methods; arrays; memory allocation and garbage collection in java keywords.

Class; Packages; scope and lifetime; Access specifiers; Constructors; Copy constructor; this reference; finalize () method; arrays; Memory allocation and garbage collection in java keywords; variable argument list; command line arguments; super keyword.

Basic idea of multithreaded programming; The lifecycle of a thread; Creating thread with the thread class and runnable interface; Thread synchronization; Thread scheduling; Producer-consumer relationship; Daemon thread, Selfish threads; Basic idea of exception handling; The try, catch and throw; throws Constructor and finalizers in exception handling; ExceptionHandling.

Applet security restrictions; the class hierarchy for applets; Life cycle of applet; HTML Tags for applet.

680224 Business Programming Laboratory (DLC-4)

Course outcome focused on employability/ entrepreneurship/ skill development

S.No.	Course Outcomes	Mapping
1.	Implement interactive web page(s) using HTML, CSS.	Skill development
2.	Design a responsive web site using HTML	Entrepreneurship development
3.	Demonstrate Rich Web Application and Services	Employability development
4.	Evaluate problems and analyze data in a wide variety of business and organizational contexts	Employability development
5.	Construct software solutions by evaluating alternate architectural patterns.	Entrepreneurship development
6.	Create Connectivity and data report in vb.	Skill development

This course is an introduction to basic concepts of business modeling and underlying technologies for implementing the business practices. In this emphasis is on developing business and commercial applications. Student may be exposed the process of app development for business applications. Emphasis is placed on the implementation of programs with procedural structures, along with graphical user interfaces and event-driven code. Upon completion, students should be able to design, code, test, and debug programs based on business requirements using a selected programming language.

Coding Basics: Intro to HTML, Syntax: The HTML, head, title, & body tags, Headings, paragraphs, lists, The strong & em tags, The doctype, The lang attribute, Coding Links: Absolute & Relative URLs, Anchor tags & hrefs, Linking to other websites, Linking to pages within a website, Opening a link in a new browser, window/tab, Adding Images, The break tag, The image tag & source attribute, Using the width, height, & alt attributes, Using horizontal rules, Intro to Cascading Style Sheets (CSS): The style tag, Tag selectors, The font-size, font-family, color properties, Hexadecimal color codes.