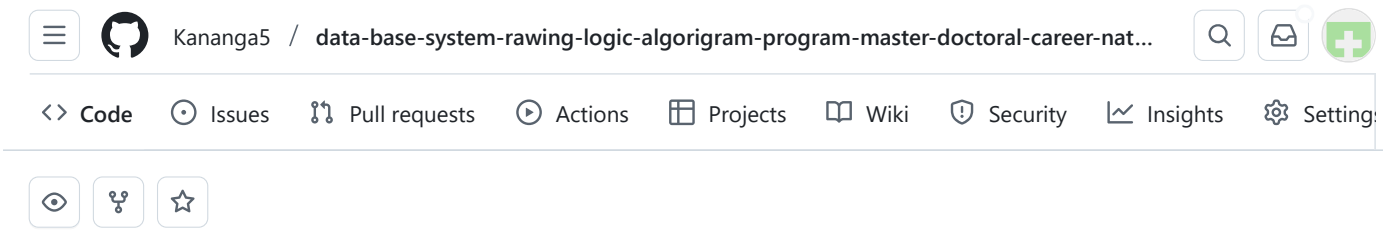

data bse system programme

GPL-3.0 license

Code of conduct

Contributing

Security policy

0 stars **0** forks **0** watching Branches Activity

Tags

Public repository

data-base-system-rawing-logic-algorigram-program-master-doctoral-career-nated-

data bse system programme

' ' Macro1 Macro ' Code resetb and initialize form with default form . Sub reset _form () Dim I row as long With .txt student name.text=" " Txt student name backcolor +vb white Txt father name .text ="" Txt father name back color + vb white . Txt dob text =""""""" '

' Application.Goto Reference:="Macro1" ActiveWorkbook.Save ActiveWorkbook.Save Range("B34").Select ActiveSheet.Paste Range("B36:Y63").Select ActiveSheet.ListObjects.Add(xlSrcRange, Range("$B$36:$Y$63"), , xlNo).Name = _ "Table16" Range("Table16[#All]").Select ActiveWindow.ScrollRow = 31 ActiveWindow.ScrollRow = 30 ActiveWindow.ScrollRow = 29 ActiveWindow.ScrollRow = 28 ActiveWindow.ScrollRow = 27 ActiveWindow.ScrollRow = 26 Range("O32").Select ActiveWindow.ScrollColumn = 1 Range("B38").Select ActiveCell.FormulaR1C1 = "7" Range("C38").Select ActiveCell.FormulaR1C1 = "8" Range("D38").Select ActiveCell.FormulaR1C1 = "9" Range("E38").Select ActiveWorkbook.Save End Sub

Sub Macro2() ' ' Macro2 Macro ' text field buttons for the number operator button for the result off , clear , back space option explicit public class form 1 dim operand 1 as double dim operad 2 as double dim {operator} as string dim has decimal boolean dim tmp nalue as double '

' Application.Run _ "'Copy of PROJECT DRAWING WORKSHET TSHINGOMBE DESIGN ANALYSE ENGIN Book12.xlsx'!Macro2" End Sub Sub Macro3() ' ' Macro3 Macro ' "500000fff03ff000018000a0410000d00095000001" string .cmd=" "; cmd=cmd+"5000";//sub head (not) cmd=cmd+"00"//network number cmd+cmd+"ff";//plc number cmd+""03ff";//demand object module i/o.number cmd=cmd+"001c";length demand data cmd=cmd+cmd+000A";cpu in '

' End Sub

Vt kw Ct output c

frm1 - 1 Private Sub ComboBox1_Change() End Sub Private Sub ComboBox2_Change() End Sub Private Sub ComboBox3_Change() End Sub Private Sub ComboBox4_Change() End Sub Private Sub ComboBox5_Change() End Sub Private Sub CommandButton1_Click() End Sub Private Sub CommandButton2_Click() End Sub Private Sub CommandButton3_Click() End Sub Private Sub Frame1_Click() End Sub Private Sub Label1_Click() End Sub Private Sub Label2_Click() End Sub Private Sub Label3_Click() End Sub Private Sub Label5_Click() End Sub Private Sub Label6_Click() End Sub Private Sub TextBox1_BeforeDragOver(ByVal Cancel As MSForms.ReturnBoolean, ByVal Data As MSForms.DataO bject, ByVal X As Single, ByVal Y As Single, ByVal

DragState As MSForms.fmDragState, ByVal Effect As M SForms.ReturnEffect, ByVal Shift As Integer) End Sub Private Sub TextBox1_BeforeDropOrPaste(ByVal Cancel As MSForms.ReturnBoolean, ByVal Action As MSForms. fmAction, ByVal Data As MSForms.DataObject, ByVal X As Single, ByVal Y As Single, ByVal Effect As MSFo rms.ReturnEffect, ByVal Shift As Integer) End Sub Private Sub TextBox1_Change() End Sub Private Sub TextBox1_DblClick(ByVal Cancel As MSForms.ReturnBoolean)frm1 - 2 End Sub Private Sub TextBox1_DropButtonClick() End Sub Private Sub TextBox1_Enter() End Sub Private Sub TextBox1_Error(ByVal Number As Integer, ByVal Description As MSForms.ReturnString, ByVal S Code As Long, ByVal Source As String, ByVal HelpFile As String, ByVal HelpContext As Long, ByVal Cance lDisplay As MSForms.ReturnBoolean) End Sub Private Sub TextBox1_KeyDown(ByVal KeyCode As MSForms.ReturnInteger, ByVal Shift As Integer) End Sub Private Sub TextBox1_KeyPress(ByVal KeyAscii As MSForms.ReturnInteger) End Sub Private Sub TextBox1_KeyUp(ByVal KeyCode As MSForms.ReturnInteger, ByVal Shift As Integer) End Sub Private Sub TextBox1_MouseDown(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByV al Y As Single) End Sub Private Sub TextBox1_MouseMove(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByV al Y As Single) End Sub Private Sub TextBox1_MouseUp(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByVal Y As Single) End SubUserForm1 - 1 Private Sub CommandButton1_Click() End Sub Private Sub CommandButton2_Click() End Sub Private Sub CommandButton3_Click() End Sub Private Sub Frame1_Click() End Sub Private Sub Label1_Click() End Sub Private Sub Label3_Click() End Sub Private Sub Label5_Click() End Sub Private Sub TextBox1_Change() End Sub Private Sub TextBox2_Change() End Sub Private Sub TextBox3_Change() End Sub Private Sub TextBox4_AfterUpdate() End Sub Private Sub TextBox4_BeforeDragOver(ByVal Cancel As MSForms.ReturnBoolean, ByVal Data As MSForms.DataO bject, ByVal X As Single, ByVal Y As Single, ByVal DragState As MSForms.fmDragState, ByVal Effect As M SForms.ReturnEffect, ByVal Shift As Integer) End Sub Private Sub TextBox4_BeforeDropOrPaste(ByVal Cancel As MSForms.ReturnBoolean, ByVal Action As MSForms. fmAction, ByVal Data As MSForms.DataObject, ByVal X As Single, ByVal Y As Single, ByVal Effect As MSFo rms.ReturnEffect, ByVal Shift As Integer) End Sub Private Sub TextBox4_BeforeUpdate(ByVal Cancel As MSForms.ReturnBoolean) End Sub Private Sub TextBox4_Change() End Sub Private Sub TextBox4_DblClick(ByVal Cancel As MSForms.ReturnBoolean) End Sub Private Sub TextBox4_DropButtonClick() End SubUserForm1 - 2 Private Sub TextBox4_Enter() End Sub Private Sub TextBox4_Exit(ByVal Cancel As MSForms.ReturnBoolean) End Sub Private Sub TextBox4_KeyDown(ByVal KeyCode As MSForms.ReturnInteger, ByVal Shift As Integer) End Sub Private Sub TextBox4_KeyPress(ByVal KeyAscii As MSForms.ReturnInteger) End Sub Private Sub TextBox4_KeyUp(ByVal KeyCode As MSForms.ReturnInteger, ByVal Shift As Integer) End Sub Private Sub TextBox4_MouseDown(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByV al Y As Single) End Sub Private Sub TextBox4_MouseMove(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByV al Y As Single) End Sub Private Sub TextBox4_MouseUp(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByVal Y As Single) End Sub Private Sub UserForm_Click() End SubUserForm3 - 1 Private Sub ComboBox1_Change() End Sub Private Sub CommandButton1_Click() End Sub Private Sub CommandButton2_Click() End Sub Private Sub CommandButton3_Click() End Sub Private Sub Label1_Click() End Sub Private Sub ListBox1_Click() End Sub Private Sub SpinButton1_AfterUpdate() End Sub Private Sub SpinButton1_BeforeDragOver(ByVal Cancel As MSForms.ReturnBoolean, ByVal Data As MSForms.Da taObject, ByVal X As Single, ByVal Y As Single, ByVal DragState As MSForms.fmDragState, ByVal Effect A s MSForms.ReturnEffect, ByVal Shift As Integer) End Sub Private Sub SpinButton1_BeforeUpdate(ByVal Cancel As MSForms.ReturnBoolean) End Sub Private Sub SpinButton1_Change() End Sub Private Sub SpinButton1_Enter() End Sub Private Sub SpinButton1_Exit(ByVal Cancel As MSForms.ReturnBoolean) End Sub Private Sub SpinButton1_KeyPress(ByVal KeyAscii As MSForms.ReturnInteger) End Sub Private Sub SpinButton1_KeyUp(ByVal KeyCode As MSForms.ReturnInteger, ByVal Shift As Integer) End Sub Private Sub SpinButton1_SpinDown() End SubUserForm5 - 1 Private Sub ComboBox1_Change() End Sub Private Sub UserForm_Activate() End Sub Private Sub UserForm_AddControl(ByVal Control As MSForms.Control) End Sub Private Sub UserForm_BeforeDropOrPaste(ByVal Cancel As MSForms.ReturnBoolean, ByVal Control As MSForms .Control, ByVal Action As MSForms.fmAction, ByVal Data As MSForms.DataObject, ByVal X As Single, ByVal Y As Single, ByVal Effect As MSForms.ReturnEffect, ByVal Shift As Integer) End Sub Private Sub UserForm_Click() End Sub Private Sub UserForm_Error(ByVal Number As Integer, ByVal Description As MSForms.ReturnString, ByVal S Code As Long, ByVal Source As String, ByVal HelpFile As String, ByVal HelpContext As Long, ByVal Cance lDisplay As MSForms.ReturnBoolean) End Sub Private Sub UserForm_Initialize() End Sub Private Sub UserForm_KeyDown(ByVal KeyCode As MSForms.ReturnInteger,

UserForm_Initialize() End Sub Private Sub UserForm_KeyDown(ByVal KeyCode As MSForms.ReturnInteger, ByVal Shift As Integer) End Sub Private Sub UserForm_KeyPress(ByVal KeyAscii As MSForms.ReturnInteger) End Sub Private Sub UserForm_MouseDown(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByV al Y As Single) End Sub Private Sub UserForm_MouseUp(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByVal Y As Single) End Sub Private Sub UserForm_RemoveControl(ByVal Control As MSForms.Control) End Sub Private Sub UserForm_Resize() End Sub Private Sub UserForm_Terminate() End SubUserForm7 - 1 Private Sub ComboBox1_Change() End Sub Private Sub ComboBox2_Change() End Sub Private Sub CommandButton1_Click() End Sub Private Sub CommandButton2_Click() End Sub Private Sub CommandButton3_Click() End Sub Private Sub CommandButton5_Click() End Sub Private Sub CommandButton6_Click() End Sub Private Sub CommandButton8_Click() End Sub Private Sub CommandButton9_Click() End Sub Private Sub Label1_Click() End Sub Private Sub Label2_Click() End Sub Private Sub Label3_Click() End Sub Private Sub Label5_Click() End Sub Private Sub ListBox1_Click() End Sub Private Sub ScrollBar1_Change() End Sub Private Sub UserForm_Activate() End Sub Private Sub UserForm_Click() End SubUserForm8 - 1 Private Sub Frame1_Click() End Sub Private Sub Frame3_Click() End Sub Private Sub Frame5_Click() End Sub Private Sub Label13_Click() End Sub Private Sub Label14_Click() End Sub Private Sub Label5_Click() End Sub Private Sub TextBox11_Change() End SubModule2 - 1Module3 - 1 Sub frm1() End SubModule4 - 1 Private Sub CommandButton1_Click() End Sub Private Sub CommandButton2_Click() End Caption = "UserForm1" ClientHeight = 8664 ClientLeft = 108 ClientTop = 456 ClientWidth = 19884 OleObjectBlob = "frm1tshingombe.frx":0000 StartUpPosition = 1 'CenterOwner WhatsThisButton = -1 'True WhatsThisHelp = -1 'True End Attribute VB_Name = "frm1" Attribute VB_GlobalNameSpace = False Attribute VB_Creatable = False Attribute VB_PredeclaredId = True Attribute VB_Exposed = False End Sub End Sub End Sub End Sub Private Sub Frame1_Click()VERSION 5.00 Begin {C62A69F0-16DC-11CE-9E98-00AA00574A4F} UserForm3 Caption = "UserForm3" ClientHeight = 7476 ClientLeft = 108 ClientTop = 456 ClientWidth = 19812 OleObjectBlob = "UserForm3tshingombe.frx":0000 StartUpPosition = 3 'Windows Default WhatsThisButton = -1 'True WhatsThisHelp = -1 'True End Attribute VB_Name = "UserForm3" Attribute VB_GlobalNameSpace = False Attribute VB_Creatable = False Attribute VB_PredeclaredId = True Attribute VB_Exposed = FalseNewMacros - 1 Sub Macro1() ' ' Macro1 Macro ' visual basic atm program .sten object by system .event)hand ' "&chr(10)&"public class transaction box ' "&chr(10)&"const service as decimal =6.5 ' "&chr(10)&"const pin as integer +9343 ' "&chr(10)&"dim balance as decimal =150 ' "&chr(10)&"private sub label 12_click (by sender System.object event arg handles labe ' End SubClass3 - 1Class4 - 1 Private Sub CommandButton1_Click() End Sub Private Sub CommandButton2_Click() End Sub Private Sub CommandButton3_Click()

UserForm9 - 1 Private Sub Frame3_Click() End Sub Private Sub TextBox6_Change() End SubBASE THREE PHASE SMART POWER : -CONTENT INTRODUCTION SERIES MKM35512 SERIES CONNECTOR FOR MCU CURRENT TRANSFORM VOLTAG E CIRCUIT EPROM FSW 32 CRYSTAL SWD I/O CLK GPRS /LGT MODULE OPTICAL RSS OPTICAL relay driver convert ,power supply , power magnetic IR INTERFACE IE82008-2 COMMUNICATION

1. TYPE OF MEASUREMENT
2.

METERIN G ALGORITH 3. ACCRACY NOMIL VOLTAGE CURRENT RANGE 6. NOMIN 7. METE R CONST 8.(IMP/ KWH,M /K FUNCT INALITY L9. VOL TAGE SENSOR 10. 14. TAMP ER DETECTION 18. NAL NVA 19. FLASH 20. 23. Standby mode power from 24. Power – down power Label23 Label24 Label25 Label26 Label27 Label28 Label29 Label30 Label31 Label32 Frame1

Breakers calculat on a symmetrical current rating : fault calculation : on note interrupted capabilities ,I1,and ,I2,at operating voltage must not exceed maximi symmetrical .

- 13,8 kV ,,breakers x/R= 15, 375 MVA,transfo 13,8 kV primary ,3750kva , secondary ,4,16 ,,,50vpc ,w On system,13,8 kV system ,3,75 MVA base , Z=3.75MVA/375,,= 0,01 Pu or 1% Z^2=X^2+RR^2=R^2(x^2/ R^2+1) R=Z/√x^2/R^2+1=1/√266=1/15.03=0,066% X=X/R(R)=15(0,0066)=99% Transformer standard standard ,5,5% impedance has ,+ 75 manufacture toleri, Transformer standard ,5,5% impedance .. From transformer loss per unit percent ,R is calcul . 31,000 watts full load -6,800 watt no load load

24,209 watt load losses R= 24,2kw/3750 KVA = 0,0065 Pu or ,0,65%

- transform x = √ z^ 2-R^2.√(5.09)^2-(0,65)^2=√25.9 ^2-0,42=√25,48=5,05%

```
X.          R.        X/ R
```

13,8 kV system 0,98%. 0,066%. 15 Transfo. 5,05%. 0,65%. 8 Systt total. 0,04%. 0,76%. 8 .tree

For three phase ,i3 phase = E/x ,, X ohm .. I3 phase = IB/X,, IB is base ,,

- base current IB = 3,75MVA/√3(4,16Kv)=0,52k.A I3 phase = I1/ x = 0,52 /0,0604=8,6k, sym ,,syst ,x/ R= 9 is less 15 Duty circuit ,is 8,6 ka three phase I and moment .. 8,6× 1,6 = 13,7 KA. I 3
- for line - to grounv fault , ILG = 3E/2x1+X0=4IB/2x1+xo ,xo is seauet reactance transformer positive .. ILG= 3(0,52)/2+0,0604)+(0,0505=9,@KA sym .. The ,50 vcp ,, applied,z= x ,in= x = 0,52/0,55=9,5ka stm , X/ R ration ,15 or less multiot ,10 for short circuit bdury ,short circuit duty is then 8,5 kA ,sym ,(I1,I2) and momentary is 9,5 × 1,6 ka = 15,ka (i3)...

Design distributor system drawing note / build..

1.4.1.2.5.Fault calculation check break application or generator bus for the system generator shoe each generator ,7.5 MVA ,,4,16 kV ,,1049 full load ,I b = 1,04:,sub transient reactance ,x"d= 11% ,,or x = 0,x= pu , Gen ,x/R ratio ,30.

1/X's= 1/x+1/x+1/x== 3and 1/Rs= 1/R+;1/R+1/R=3/R.. X's= x/3and Rs ,= Rs=R/3,, system ,X's/Rs = x/R= gen .x/R=39,, generator neutral grounding reactor are used to limited the ilg ,to i3 phase ,IB phase = ib / x + I/ x+1b/x+31b/x= 3(1,04)/0,1@=28,4 ka ,symetru,E/x Amper ,system ,x/R of I multiple b..short circuit duty is 28,4 (29,5 symetricaj .. -Three phase symmetrical interri capacity

Breaker type|vmax| max ki| at 4,16 op vo

1.4.1.2.6.Overview : research in training and .university and college ,cpd learning campagnie work base : experiemental. Module ,construction distribution system design

- describe between fault current peak ,value ,RMS symmetrical value .RMS , asymmetric value ,X/R ratio , I= symmetrical RMS current ,IP = peak current,e= 2,71,wv,= 2.p.f .. Cycle (ANSI/IEEE.C37.13.2.2015.. -Design a distribution system. -Developm of a system one - line ..imp, --_Standard drawing , additional d rawing --schedule and specification
- power systems voltage , Voltage classified
- income service Volta,income consider
- type of system: Power system analyse ,short current wave.
- fault current calculat, fault calculai for specifications,medium voltage ,breaker fault ,molded circuit breaker , interruption derating ,trNsfot loads data ,voltage drop , Grounding ground fault ,
- typicK power systt generator and generator system ,generator short circuit ,caractt,generator set size ,rating ,generator installation site 'capacitor and power factor , motor power factor correction ,
- typical applicatt ,health facilities ,quickly generator and load bank ,power quality,

- power quality seism ,ampacities for conductor ,NPA 70-2014,
- safety goal power hazard oashs , NEC
- regulation requ & Maximum flexibility ,minimum
- maximizing electrical minimy operating : loss conductor transfory . : discussed further ,
- development phase : input plumbing construction v.
- construcy documents : project ..

Experiemental orientation guide workbase Manuel construction guidelines:

- electrical engineering Electrician Design. ,, Z×A×U= . ΔU.2L××Pxz×Z×A

..**schema electrical / drawing design panel _____&

- electrical power effect dynamic between 2 conduct ,3 conductor parallel , consumer power AC ,DC Courent I1,I 2.. S= porter in cm ,a = distance in cm ,, P= U× I.[W].IP.U P=U×I×cos .flux ..IP × U× cos alph . P= 3×I×I×cos [W] IP×3×U×cos flux F2, 0,2×I@×2×s,a =.....(N) F3=0,808×F2[N] F3=0,865×F2[N] F3=0,865×F2[N] -resistancd of conductor,L= ligth of conductor ,m aluminy,
- Z = conductivity, m /mm ion , A = across area conductor ,mm Sq..
- resistance = of coiling of induction condensator , L = inductance ,H ,f = frequency ,Hz ,,C = capacity ,f v= angle phase ,xl= reactance inductive ,O,
- series parallel installation , U=I×R[V].I.U..R=, R.I..ohmm × 33 m ,ohm m× 8,3 mm Sq × ohm XL= 2×π×f×L, XC ,,2× π×f×c { = ZR2(XL-XC)2=+ZR,,cos = --- ohm

RG, R1R2/R1+R2=.. R1R2×R×./ .. Z..Z.@..Z2..=, X..X..

1.4.1.2.51..Cable and conductor : value short circuit current ,,assignment current ,, Transformation

- system design of cable conductor: Cable PVC,0,75 mm , souple,H05V - K ,0,75 black ,,big cable coutchouc ,3 conductor = 2,5 mm ,,
- protection , green yellow , symbol h ,supply voltage ,300/ 300v,03,,$00/500,450/750v Material insulation cable : caoutchouc naturej styrene ,butadiene silicon material,PVC ,styrene tressfibre
- construction specialist cable : meplat with conductor separe H,NHL ,,cable plastic gain ,cable concentric onduke
- characteristics of materials : polythylene ,elastic ,thermoplastic ,color ,grid degree Up ,stabilt chemit,alcol verni

Fuse motor tree phase value rotor squire ,(DIN VDE 0636,, Control thermic ,,start delta over load max start ,2 × assignt current , max 5 sec ,, regulation 0,58,, Switch ,switch gear ,,, close open circuit Usage current , I = courent etablid ,IC = courent coupe,I e = courant assigned d employ ,u tension avant fermeture ,u r = tension established ,AC load command DC Serie AC , IEC/EN 60847-3(VDE 0660 partie switch for motor starting b,,power cut open close ,L/Rv,ms. Break current .

Letter and Laball switch USA .. S ,switcy combination lock non lokkin, disconnect switch ,drum switch ,flow operated switch ,foot operated switch , knife switch ,limited switch ,Liquide levek actuated switch ,locking switch,master switch, mushroom head,pressure or vacut,operated switch,pushbuy or vacut, pushbuy swity,pushilluminates ,rotary switch stepping switch single throw switch ,speed switch ,temperat actuated , time delay switch ,toggle switch transfer switch ,wobble stick , fuel contactor ,relay blowotbreak coil field ,commutating field compensating ,generator ,motor separately excited ,series field ,shunt field , diode Connector,,

- Consol visual ,prodibus , can bopen ethernet commuyaty ,net pin 1, pin Atex , installation

Command automatics

Installatt port ethernet ,port ethernet prise RJ45,led ,port com Synopsis cabling system Logigrame algorithm ,commutator.

Sub Macro1() ' ' Macro1 Macro ' visual basic atm program .sten object by system .event)hand ' "&chr(10)&"public class transaction box ' "&chr(10)&"const service as decimal =6.5 ' "&chr(10)&"const pin as integer +9343 ' "&chr(10)&"dim balance as decimal =150 ' "&chr(10)&"private sub label 12_click (by sender System.object event arg handles labe ' End Sub Sub Macro2() ' ' Macro2 Macro ' type meter three phase ac static watt hous smart ' "&chr(10)&"metering algorith ' "&chr(10)&"accuracy nomial voltage mettering frequence metering const functionality current sensors energy pulse energy temper detection remote communication iec 62056 extrevm internal battery ' ActiveWindow.ActivePane.VerticalPercentScrolled = 205 ActiveWindow.ActivePane.VerticalPercentScrolled = 146 Selection.TypeText Text:= _ "---" Selection.TypeText Text:= _ "---" Selection.TypeText Text:="-------" Selection.TypeParagraph Selection.PasteAndFormat (wdFormatOriginalFormatting) ActiveWindow.ActivePane.VerticalPercentScrolled = 146 Selection.TypeParagraph Selection.Paste ActiveDocument.Save ActiveWindow.ActivePane.VerticalPercentScrolled = 207 ActiveWindow.ActivePane.VerticalPercentScrolled = 202 ActiveWindow.ActivePane.VerticalPercentScrolled = 197 ActiveWindow.ActivePane.LargeScroll Down:=1 ActiveWindow.ActivePane.VerticalPercentScrolled = -75 ActiveWindow.ActivePane.VerticalPercentScrolled = -41 Windows("Doc8 drawing tshingombe fiston").Activate Windows("Doc2 drawing tshingombe").Activate ActiveWindow.ActivePane.VerticalPercentScrolled = 127 ActiveWindow.Close ActiveWindow.Close ActiveWindow.Close ActiveWindow.Close ActiveWindow.Close ChangeFileOpenDirectory "C:\Users\Library SIX\Desktop" ActiveDocument.SaveAs2 FileName:="Doc1 tshing.docx", FileFormat:= _ wdFormatXMLDocument, LockComments:=False, Password:="", AddToRecentFiles _ :=True, WritePassword:="", ReadOnlyRecommended:=False, EmbedTrueTypeFonts _ :=False, SaveNativePictureFormat:=False, SaveFormsData:=False, _ SaveAsAOCELetter:=False, CompatibilityMode:=15 ActiveWindow.Close Application.Quit End Sub Sub Macro3() ' ' Macro3 Macro ' register computer select pin input out put ' "&chr(10)&"binaire code adress x1,x2,x3,x4,x5,x6,x7, ' Application.Run MacroName:="frm1" End Sub Sub frm1() ' ' frm1 Macro ' if x1,x2,x3,x4 ,x5,x6,x7,x8,x9 then register else select ,,, end if select case x1 and select x2 and iteractive execute loop for each while the statemnt " if x1 then" x2 or" sub " block statemnt ,, arrays paraenthes declare , create consol mod '

End Sub

VERSION 5.00 Begin {C62A69F0-16DC-11CE-9E98-00AA00574A4F} UserForm12 Caption = "UserForm12" ClientHeight = 8736 ClientLeft = 108 ClientTop = 456 ClientWidth = 19764 OleObjectBlob = "UserForm computer x 1 tshingombe.frx":0000 StartUpPosition = 1 'CenterOwner WhatsThisButton = -1 'True WhatsThisHelp = -1 'True End Attribute VB_Name = "UserForm12" Attribute VB_GlobalNameSpace = False Attribute VB_Creatable = False Attribute VB_PredeclaredId = True Attribute VB_Exposed = False

7topics :

4.1 .12.15.7.1.Masters in Vertical Farming and Urban Agriculture with Focus on Synthetic Biology This course explores the intersection of vertical farming, urban agriculture, and synthetic biology, preparing students to innovate in sustainable food production. Students will gain theoretical knowledge and practical skills to design and implement urban farming systems that leverage synthetic biology for enhanced productivity and sustainability.

7.2Introduction to Vertical Farming and Urban Agriculture An overview of vertical farming and urban agriculture, their roles in modern food production, and how they contribute to sustainability.: n overview of

vertical farming and urban agriculture, their roles in modern food production, and how they contribute to sustainability.

Key Topics: • Definitions and Concepts: Understanding what vertical farming and urban agriculture entail.

• Historical Development: Tracing the evolution of these farming techniques.

• Sustainability Contributions: How these methods reduce the carbon footprint and promote resource efficiency.

7.3.Fundamentals of Synthetic Biology Study the basic principles of synthetic biology, including DNA sequencing, genetic engineering, and how these tools are used to optimize plant growth.: Fundamentals of Synthetic Biology Study the basic principles of synthetic biology, including DNA sequencing, genetic engineering, and how these tools are used to optimize plant growth.

Key Topics: • Introduction to Synthetic Biology: Basic concepts and terminology.

• DNA Sequencing and Genetic Engineering: Techniques and applications.

• Plant Optimization: How synthetic biology enhances plant growth and resilience

7.4..Applications of Synthetic Biology in Urban Agriculture Explore how synthetic biology is revolutionizing urban farming, including genetically modified organisms and engineered biosystems that improve crop yield.:

7.6Design of Vertical Farming Systems Learn the architectural and systems design principles for creating efficient vertical farms in urban environments.: Explore how synthetic biology is revolutionizing urban farming, including genetically modified organisms (GMOs) and engineered biosystems that improve crop yield.

Key Topics: • GMOs in Urban Farming: Benefits and challenges.

• Engineered Biosystems: Innovations that enhance productivity and sustainability.

• Case Studies: Examples of successful applications in urban agriculture.

7.7Integration of Biotechnology in Crop Production Discuss the integration of biotechnology tools to enhance crop resilience, nutrient uptake, and pest resistance.: Explore the potential future advancements in vertical farming and synthetic biology.

Key Topics: • Innovative Technologies: Emerging tools and techniques.

• Sustainability Goals: Advancing towards more sustainable and resilient food systems.

• Research and Development: Ongoing projects and future research directions.

These courses will provide students with a comprehensive understanding of the intersection between vertical farming, urban agriculture, and synthetic biology, equipping them to innovate and lead in the field of sustainable food production.

Feel free to ask if you need more details or specific information on any of these topics!

7.8.Environmental and Economic Impacts of Urban Agriculture Evaluate the environmental and economic benefits and challenges posed by urban agriculture and vertical farming.

7.9.Regulatory and Ethical Considerations in Synthetic Biology Examine the regulatory frameworks and ethical considerations associated with the use of synthetic biology in agriculture.: Regulatory frameworks for synthetic biology vary globallyRegulatory frameworks for synthetic biology vary globally

7.10Future Trends in Vertical Farming and Synthetic Biology Explore the potential future advancements in vertical farming technologies and synthetic biology app· · Equity and Access: Ensuring fair access to the benefits of synthetic biology

8..topic

4.1 .12.15..8.Master's in Urban Water Supply, Sewerage, Waste Management, and Remediation Activities 8.1. This course delves into the complexities of urban infrastructure related to water supply, sewerage, waste management, and remediation activities. Students will explore the technical, environmental, and policy-related aspects of effective urban planning necessary to manage these essential services sustainably. The course equips graduates with the skills to address challenges related to population growth, urbanization, and climate change in water and waste sectors.

8.2.Introduction to Urban Water Supply Systems Explore the components of urban water supply systems, including water sourcing, treatment, distribution, and quality management. Understand the challenges and technological advancements in managing urban water supply.:

Explore the components of urban water supply systems, including water sourcing, treatment, distribution, and quality management. Understand the challenges and technological advancements in managing urban water supply.

Key Topics: • Water Sourcing: Identifying and managing sources of water such as rivers, lakes, and groundwater.

• Water Treatment: Processes for purifying water to meet safety and quality standards.

• Distribution Systems: Designing and maintaining networks for efficient water delivery.

• Quality Management: Monitoring and ensuring the quality of water supplied to urban areas.

8.3 Sewerage Systems Design and Manage

8.3.Sewerage Systems Design and Management Learn about the engineering, design, and operational management of urban sewerage systems, focusing on sustainable practices and innovations in waste treatment and resource recovery.: Sewerage Systems Design and Management Learn about the engineering, design, and operational management of urban sewerage systems, focusing on sustainable practices and innovations in waste treatment and resource recovery.

Key Topics: • Engineering Principles: Understanding the fundamentals of sewerage system design.

• Sustainable Practices: Implementing environmentally friendly waste treatment methods.

• Resource Recovery: Techniques for reclaiming and repurposing resources from was

8.4.Urban Waste Management Strategies Understand the principles and methods of waste management in urban areas, addressing : Understand the principles and methods of waste management in urban areas, addressing the complexities and challenges of managing solid and liquid waste effectively.

Key Topics: • Waste Collection and Disposal: Strategies for efficient waste collection, segregation, and disposal.

• Recycling and Reuse: Promoting recycling and reuse to minimize waste generation.

• Waste Reduction: Implementing programs and policies to reduce overall waste output.

8.5.Remediation Activities and Technologies Explore different technologies and methodologies used in the remediation of contaminated sites, focusing on both chemical and biological methods. Learn how to effectively integrate water supply, sewerage, and waste management into urban planning processes to create more sustainable and livable cities.

Key Topics: • Urban Planning Principles: Incorporating water and waste considerations into urban design.

• Interdisciplinary Approaches: Collaborating with various stakeholders for holistic planning.

• Sustainable Development Goals: Aligning urban planning with global sustainability objectives.

These courses provide a comprehensive understanding of urban water supply, sewerage, waste management, and remediation activities, preparing students to tackle the challenges of modern urban infrastructure.

If you need more details or have specific questions on any of these topics, feel free to let me know!

8.6.Policy and Regulation in Urban Water and Waste Gain insights into the regulatory frameworks and policies that govern urban water and waste management. Explore how legislation impacts planning and operational practices. Learn how to effectively integrate water supply, sewerage, and waste management into urban planning processes to create more sustainable and livable cities.

Key Topics: • Urban Planning Principles: Incorporating water and waste considerations into urban design.

• Interdisciplinary Approaches: Collaborating with various stakeholders for holistic planning.

• Sustainable Development Goals: Aligning urban planning with global sustainability objectives.

These courses provide a comprehensive understanding of urban water supply, sewerage, waste management, and remediation activities, preparing students to tackle the challenges of modern urban infrastructure.

If you need more details or have specific questions on any of these topics, feel free to let me know!

8.7.Climate Change and its Impact on Water and Waste Management Examine how climate change affects urban water and waste systems and explore adaptive strategies to enhance resilience and sustainability.

8.8..Sustainable Innovations in Water and Waste Systems Discover emerging technologies and innovative practices for enhancing sustainability in urban water and waste management systems.: The pursuit of sustainability in urban water and waste management systems involves adopting emerging technologies and innovative practices. Here are some cutting-edge innovations:

Emerging Technologies:

1. `Smart Water Management Systems`

o Utilize IoT sensors and real-time data analytics to monitor water quality, detect leaks, and optimize water usage.

o Implement smart meters to provide accurate water consumption data and encourage conservation.

2. `Advanced Water Treatment Technologies`

o Adopt membrane filtration, advanced oxidation processes, and nanotechnology to enhance water purification and recycling.

1. `Use desalination technologies to convert seawater into aste-to-Energy Technologies`

o Convert organic waste into biogas through anaerobic digestion, reducing landfill waste and generating renewable energy.

o Implement gasification and pyrolysis to transform solid waste into syngas and biochar.

2. `Decentralized Wastewater Treatment`

o Develop decentralized systems that treat wastewater close to the source, reducing the need for extensive sewer networks and lowering energy consumption

sewer networks and lowering energy consumption.

o Use constructed wetlands and natural treatment systems for cost-effective and sustainable wastewater management.

3. `Green Infrastructure`

o Integrate green roofs, permeable pavements, and rain gardens to manage stormwater and reduce urban heat islands.

o Employ urban wetlands and bioswales to enhance natural water filtration and storage.

Innovative Practices: o

1. `8.9Integrating Water and Waste Systems into Urban PlanningHolistic Planning Approaches`

o Adopt integrated planning frameworks that consider water and waste systems as interconnected components of urban infrastructure.

o Use spatial planning tools to optimize the placement of water and waste facilities, minimizing environmental impact and maximizing efficiency.

2. `Sustainable Development Goals (SDGs)`

o Align urban planning efforts with the United Nations Sustainable Development Goals, particularly SDG 6 (Clean Water and Sanitation) and SDG 11 (Sustainable Cities and Communities).

o Promote sustainable land use practices that protect water resources and reduce waste generation.

3. `Interdisciplinary Collaboration`

o Foster collaboration among urban planners, engineers, environmental scientists, and policymakers to develop comprehensive solutions.

o Engage stakeholders, including local communities, businesses, and NGOs, in the planning process to ensure diverse perspectives and needs are addressed.

4. `Climate Resilience and Adaptation`

o Incorporate climate resilience measures into urban planning to address the impacts of climate change on water and waste systems.

o Develop adaptive strategies to manage extreme weather events, such as floods and droughts, and ensure the continuity of essential services.

5. `Green and Blue Infrastructure Integration`

o Integrate green infrastructure (e.g., parks, green roofs) and blue infrastructure (e.g., rivers, lakes) into urban landscapes to enhance ecosystem services and improve water management.

o Design urban spaces that promote natural water infiltration, reduce runoff, and support biodiversity.

6. `Data-Driven Decision Making`

o Utilize Geographic Information Systems (GIS), remote sensing, and data analytics to inform planning decisions and monitor system performance.

o Implement smart city technologies to enhance the management and operation of water and waste systems.

By adopting these strategies and embracing innovative technologies, urban planners can create more sustainable, resilient, and livable cities that effectively manage water and waste systems.

If you have any specific questions or need more detailed information on any of these topics, feel free to ask!

Learn how to effectively integrate water supply, sewerage, and waste management into urban planning processes to create more sustainable and livable cities.

9.topic

4.1 .12.15..9.1.Transportation and Warehousing in Tourism Planning and Development This course offers a comprehensive study into how transportation and warehousing play a crucial role in tourism planning and development. Students will explore the logistics, infrastructure, and management strategies required to optimize tourism supply chains, improve accessibility, and enhance the overall tourist experience. This course provides insights into transportation modes, warehousing solutions, and policy frameworks essential for sustainable tourism development.

9.2..Introduction to Tourism Logistics Explores the fundamental principles of logistics management within the tourism sector, emphasizing its role in seamless travel experiences. · ransportation Modes

• Air Travel: Managing airport logistics, flight scheduling, and passenger services.

• Rail and Road Transport: Coordinating bus and rail services for tourists, ensuring efficient transit systems.

• Maritime Travel: Organizing ferry and cruise services, port management.

· Warehousing Solutions

• Storage Facilities: Designing and managing warehouses for tourism-related goods.

• Inventory Management: Techniques for maintaining op

9.3…Transportation Infrastructure in Tourism Examines the various transportation infrastructures such as airports, seaports, and road networks that support the tourism industry. Policy Frameworks

• Regulatory Compliance: Understanding laws and regulations affecting transportation and warehousing in tourism.

• Sustainability Policies: Implementing eco-friendly practices to minimize environmental impact.

9.4..Role of Warehousing in Tourism Discusses how warehousing and inventory management contribute to the efficiency of tourism operations. ogistics and Infrastructure

• Supply Chain Management: Strategies for efficient coordination of suppliers, transporters, and retailers.

• Infrastructure Development: Planning and constructing facilities to support tourism activities.

• Technology Integration: Using digital tools for tracking, scheduling, and management.

9.5..Sustainable Transport Solutions Covers sustainable practices and innovations in transportation that minimize environmental impact and promote eco-friendly tourism. Accessibility Improvement

• Barrier-Free Travel: Designing inclusive transportation systems for travelers with disabilities.

• Connectivity Enhancement: Ensuring seamless transitions between different modes of transport.

9.6..Tourism Supply Chain Management Analyzes the intricacies of supply chain management specifically in the tourism sector, including challenges and best practices. · Logistics Management Fundamentals

• Definition and Scope: Understanding what tourism logistics encompasses.

• Key Components: Identifying the main elements of tourism logistics, such as transportation, warehousing, and inventory management.

· Role in Seamless Travel Experiences

• Customer Satisfaction: Ensuring tourists have smooth and enjoyable experiences from arrival to departure.

• Efficiency and Reliability: Improving the efficiency and reliability of travel services through effective logistics.

9.7.Policy and Regulations in Tourism Transport Explores the regulations and policies affecting transportation and warehousing, and how they influence tourism development. · ogistics Challenges in Tourism

• Seasonal Demand: Managing fluctuations in demand due to tourist seasons.

• Coordination Complexity: Overcoming challenges in coordinating multiple service providers and stakeholders.

· Technological Advancements

• Digital Solutions: Utilizing technology to streamline logistics processes, such as online booking systems and real-time tracking.

• Data Analytics: Leveraging data to predict trends, optimize routes, and improve service delivery.

9.8.Innovations in Tourism Warehousing Investigates recent technological advancements in warehousing that support tourism industry needs. 9.8 Innovations in Tourism Warehousing This section investigates recent technological advancements in warehousing that support the tourism industry's needs. Some notable innovations include:

Technological Advancements:

1. `Smart Warehousing: Automation and AI-driven inventory management systems optimize workflows and reduce human error`

9.9..Case Studies on Tourism and Logistics Presents case studies highlighting logistics success and challenges in various tourism destinations. his section presents case studies highlighting logistics success and challenges in various tourism destinations. Some examples include:

Case Studies:

1. `Public Policy Co-Creation in Recife: Examines the creative tourism plan development process in Recife, Brazil`

10.topics

4.1 .12.15.10.1..Spatial Computing in Telecommunications This course explores the integration of spatial computing technologies within the telecommunications sector. Students will gain an understanding of how spatial data is utilized to enhance network efficiencies, improve service delivery, and innovate telecommunications solutions. Covering foundational concepts to advanced applications, the course is designed for those aiming to lead in the evolution of telecom networks through spatial computing innovations.

10.2. Introduction to Spatial Computing This topic covers the basics of spatial computing, its historical

10.2.Introduction to Spatial Computing This topic covers the basics of spatial computing, its historical evolution, and its current importance across various industries, with a particular focus on telecommunications. Key Topics:

1. Foundational Concepts

o Spatial Data: Understanding the types of spatial data, including geographic information systems (GIS), location-based services (LBS), and remote sensing.

o Spatial Computing Principles: Basic principles of spatial computing, including spatial analysis, data visualization, and geospatial intelligence.

2. Network Efficiencies

o Optimizing Network Design: Utilizing spatial data to design more efficient and reliable telecommunications networks.

10.3..Spatial Data and Telecommunications An exploration of the types and sources of spatial data utilized in telecommunications, as well as methods for data collection and management. · Resource Allocation: Applying spatial analysis to optimize the allocation of network resources and infrastructure placement. · Service Delivery Improvements Location-Based Services: Enhancing service delivery through the integration of location-based services and personalized user experiences. Coverage Mapping: Using spatial data to identify coverage gaps and optimize network coverage.

10.4..Geographical Information Systems (GIS) in Telecom This topic discusses the application of GIS technologies for network planning, resource optimization, and service provisioning in telecommunications. nnovative Solutions

• Smart Cities: Leveraging spatial computing to develop smart city solutions that integrate telecommunications with urban infrastructure.

• Augmented Reality (AR) and Virtual Reality (VR): Exploring the applications of AR and VR in telecommunications, such as immersive communication experiences and virtual site inspections.

10.5..Network Planning and Optimization Using Spatial Computing Strategies for using spatial computing to optimize telecom network deployments and enhancements through simulation and analytic tools.

10.6.Spatial Data Analytics for Telecom An examination of analytic techniques and algorithms that leverage spatial data to provide insights and performance improvements in telecom services. Advanced Applications

• 5G and Beyond: Investigating the role of spatial computing in the deployment and optimization of 5G networks and future technologies.

• Predictive Analytics: Using spatial data for predictive analytics to anticipate network demands and prevent service disruption

10.7..Augmented Reality (AR) in Telecommunication Services Understanding the role of AR technologies in enhancing customer experiences and operational efficiencies within telecom services. This topic covers the basics of spatial computing, its historical evolution, and its current importance across various industries, with a particular focus on telecommunications.

Key Topics:

1. Basics of Spatial Computing

o Definition and Scope: Understanding what spatial computing entails and its applications.

o Key Components: Identifying the main elements of spatial computing, such as spatial data, geospatial analysis, and visualization.

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2. Historical Evolution
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o Early Developments: Tracing the origins of spatial computing from early cartography and geographic information systems (GIS).

o Technological Advancements: Highlighting key technological advancements that have shaped the field, such as remote sensing and GPS technol

10.11..5G and Spatial Computing

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1. Investigating how 5G technology benefits from spatial computing, including precise
   location services and improved connectivity solutions. urrent Importance
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o Cross-Industry Applications: Exploring how spatial computing is used in various industries, including transportation, healthcare, retail, and agriculture.

o Focus on Telecommunications: Examining the specific applications of spatial computing in telecommunications, such as network planning, coverage optimization, and location-based services.

These courses provide students with a comprehensive understanding of spatial computing and its transformative impact on telecommunications, preparing them to lead in the innovation and optimization of telecom networks.

If you have any specific questions or need more details on a

10.12..Privacy and Security in Spatial Telecommunications A look into the potential security and privacy challenges posed by spatial data in telecommunications and strate,

Key Challenges:

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1. Data Privacy Concerns: The extensive collection and transmission of spatial data can lead
   to unauthorized access and potential privacy breaches
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11..topics

4.1 .12.15..11.1..Advanced Legal Studies in Public Administration and Safety This course is designed for Master's level students pursuing a degree in Public Administration and Safety with a focus on Legal Studies. It aims to provide students with a comprehensive understanding of the legal frameworks and principles that underpin public administration and safety mechanisms. The course covers a range of topics, from constitutional law and administrative law to policy-making and legal ethics, equipping students with the skills needed to navigate the complex legal landscape within the public sector.

11.2Introduction to Public Law An overview of the principles and functions of public law, including constitutional and administrative law, which regulate the relationship between individuals and the state.

An overview of the principles and functions of public law, including constitutional and administrative law, which regulate the relationship between individuals and the state.

Key Topics: • Principles of Public Law: Understanding the foundational concepts of public law.

• Constitutional Law: Examining the structure and functions of the constitution in regulating state authority.

• Administrative Law: Exploring the rules that govern the actions of administrative agencies.

11.3.Constitutional Law and Governance Exploration of constitutional principles and how they guide governance and the formation of public policies. Exploration of constitutional principles and how they guide governance and the formation of public policies.

Key Topics: • Constitutional Principles: Understanding fundamental principles like the rule of law, separation of powers, and checks and balances.

• Governance: Analyzing how constitutional principles influence the design and functioning of government institutions.

• Public Policy Formation: Examining the role of constitutional law in shaping public policies.

11.4.Administrative Law Understanding the rules and regulations that govern the activities of administrative agencies of government. Understanding the rules and regulations that govern the activities of administrative agencies of government.

Key Topics: • Administrative Agencies: Exploring the creation, powers, and functions of administrative agencies.

• Regulatory Frameworks: Understanding the legal frameworks that regulate administrative actions.

• Judicial Review: Examining the mechanisms for reviewing administrative decisions

11.5.Legal Frameworks for Public Safety Examination of the legal structures and policies designed to protect public safety and maintain order.

11.6..Ethics in Public Administration Study of ethical principles and how they apply to decision-making processes in public administration. Examination of the legal structures and policies designed to protect public safety and maintain order.

Key Topics: • Public Safety Laws: Analyzing laws and regulations aimed at protecting public safety.

• Policy Development: Understanding the process of developing and implementing public safety policies.

• Enforcement Mechanisms: Exploring the role of law enforcement agencies in maintaining public order.

11.7..Public Policy and Legal Implications Analysis of the intersection of law and public policy and the impact of legal frameworks on policy formation. Study of ethical principles and how they apply to decision-making processes in public administration.

Key Topics: • Ethical Theories: Understanding various ethical theories and their application in public administration.

• Decision-Making: Examining ethical considerations in decision-making processes.

• Accountability: Exploring mechanisms for ensuring ethical conduct and accountability in public administration.

Analysis of the intersection of law and public policy and the impact of legal frameworks on policy formation.

Key Topics: • Law and Policy: Understanding the relationship between legal frameworks and public policy.

• Policy Analysis: Examining the legal implications of policy decisions.

• Case Studies: Analyzing real-world examples of law influencing public policy

11.8..Human Rights and Social Justice Understanding the role of law in promoting human rights and social justice in public administration. Understanding the role of law in promoting human rights and social justice in public administration.

Key Topics: • Human Rights Law: Exploring international and domestic human rights frameworks.

• Social Justice: Examining the role of law in addressing social inequalities and promoting justice.

• Advocacy: Understanding the

11.9.Crisis Management and Legal Compliance Strategies for managing crises in public administration while ensuring compliance with legal standards. Strategies for managing crises in public administration, ensuring legal compliance, and maintaining order.

Key Topics: • Crisis Management: Developing strategies for effectively managing crises in public administration.

• Legal Compliance: Ensuring adherence to legal frameworks during crisis situations.

• Contingency Planning: Creating plans for maintaining public safety and order during emergencies.

These courses provide students with a comprehensive understanding of the legal aspects of public administration and safety, preparing them to navigate the complex legal landscape in the public sector.

If you have any specific questions or need more details on any of these topics, feel free t

12.topic

4.1 .12.15..12.1Metallurgy in Oil and Gas Production, Refining, and Transport This course provides an in-depth understanding of the metallurgical principles and practices specific to the oil and gas industry. Students will explore the selection, processing, and performance of metals used in various segments of the industry, focusing on their application in production, refining, and transport operations. The course aims to develop a comprehensive knowledge of material selection and corrosion prevention in harsh oil and gas environments.

12.2..Introduction to Metallurgy in Oil and Gas An overview of the role of metallurgy in the oil and gas industry, discussing the importance of material selection and analyzing common metallurgical challenges faced.

his course provides an in-depth understanding of the metallurgical principles and practices specific to the oil and gas industry. Students will explore the selection, processing, and performance of metals used in various segments of the industry, focusing on their application in production, refining, and transport operations. The course aims to develop a comprehensive knowledge of material selection and corrosion prevention in harsh oil and gas environments.

12.3..Material Selection for Oil and Gas Production Examines criteria for selecting materials, focusing on mechanical properties and corrosion resistance required in production environments.

An overview of the role of metallurgy in the oil and gas industry, discussing the importance of material selection and analyzing common metallurgical challenges faced.

Key Topics: • Role of Metallurgy: Understanding the critical importance of metallurgy in oil and gas operations.

• Material Selection: Factors influencing the selection of materials for different segments of the industry.

• Common Challenges: Identifying and addressing common metallurgical issues, such as corrosion and material degradation.

12.4..Corrosion Mechanisms and Prevention Explores common corrosion mechanisms in oil and gas environments, such as sulfide stress cracking and chloride stress corrosion, and presents methods for their prevention. Examines criteria for selecting materials, focusing on mechanical properties and corrosion resistance required in production environments.

Key Topics: • Mechanical Properties: Evaluating the strength, toughness, and durability of materials.

• Corrosion Resistance: Understanding the importance of corrosion resistance in harsh environments.

• Material Criteria: Criteria for selecting suitable materials for production equipment and infrastructure.

12.5..Metallurgical Processes in Refining Discusses how metallurgical processes like heat treatment and welding are utilized in refining operations to enhance material properties. Corrosion Mechanisms and Prevention Explores common corrosion mechanisms in oil and gas environments, such as sulfide stress cracking and chloride stress corrosion, and presents methods for their prevention.

Key Topics: • Corrosion Mechanisms: Understanding different types of corrosion and their causes.

• Sulfide Stress Cracking: Examining how sulfide stress cracking occurs and how to prevent it.

• Chloride Stress Corrosion: Exploring the effects of chloride stress corrosion and prevention methods.

12.6..Pipeline Materials and Design Addresses the materials and design considerations for constructing oil and gas pipelines, including the assessment of failure modes and maintenance practices. iscusses how metallurgical processes like heat treatment and welding are utilized in refining operations to enhance material properties.

Key Topics: • Heat Treatment: Techniques for enhancing the mechanical properties of metals through heat treatment.

• Welding: Best practices for welding in refining operations.

• Material Enhancement: Methods for improving the performance and longevity of materials used in refining.

12.7.Advanced Coatings and Surface Treatments Focuses on the application of advanced coatings and surface treatments to protect metals used in oil and gas industry environments. Addresses the materials and design considerations for constructing oil and gas pipelines, including the assessment of failure modes and maintenance practices.

Key Topics: • Material Selection for Pipelines: Criteria for selecting materials for pipeline construction.

• Pipeline Design: Principles of pipeline design to ensure safety and reliability.

• Failure Modes: Identifying common failure modes and strategies for prevention.

• Maintenance Practices: Best practices for maintaining pipeline integrity

Advanced Coatings and Surface Treatments Focuses on the application of advanced coatings and surface treatments to protect metals used in oil and gas industry environments.

Key Topics: • Coating Technologies: Exploring different types of coatings and their applications.

• Surface Treatments: Techniques for treating metal surfaces to enhance durability and resistance to corrosion.

• Protective Measures: Implementing protective measures to extend the lifespan of equipment.

12.8.Environmental Impact and Sustainability in Metallurgy Evaluates the environmental impact of metallurgical practices in the oil and gas industry and explores sustainable practices and innovations. Evaluates the environmental impact of metallurgical practices in the oil and gas industry and explores sustainable practices and innovations.

Key Topics: • Environmental Impact: Assessing the environmental consequences of metallurgical activities.

• Sustainable Practices: Implementing eco-friendly practices in metallurgy.

• Innovations: Exploring technological innovations for reducing environmental imp

12.9..Failure Analysis and Case Studies Explores methods for conducting failure analysis on metallurgical components and reviews real-world case studies. Evaluates the environmental impact of metallurgical practices in the oil and gas industry and explores sustainable practices and innovations.

Key Topics: • Environmental Impact: Assessing the environmental consequences of metallurgical activities.

• Sustainable Practices: Implementing eco-friendly practices in metallurgy.

• Innovations: Exploring technological innovations for reducing environmental imp

Explores methods for conducting failure analysis on metallurgical components and reviews real-world case studies.

Key Topics: • Failure Analysis Techniques: Methods for analyzing and diagnosing material failures.

• Case Studies: Reviewing real-world examples of metallurgical failures and the lessons learned.

• Preventive Measures: Developing strategies to prevent future failur

12.10Future Trends in Metallurgy for Oil and Gas Discusses emerging trends and technological advancements in metallurgy that could shape the future of the oil and gas industry. Discusses emerging trends and technological advancements in metallurgy that could shape the future of the oil and gas industry.

Key Topics: • Emerging Technologies: Exploring new technologies and their potential impact on metallurgy.

• Industry Trends: Identifying trends that are likely to influence the future of metallurgy in the oil and gas sector.

• Research and Development: Current and future research initiatives aimed at advancing metallurgical practices.

These courses provide a comprehensive understanding of metallurgical principles and practices tailored to the oil and gas industry, equipping students with the knowledge and skills necessary to address the unique challenges of this field.

If you need more details or specific information on any of these topics, feel fr

13.Topics:

4.1 .12.15..13.1.Integrated Water Management in Mining This course provides an in-depth analysis of integrated water management practices within the mining industry. It covers sustainable management and conservation of water resources, focusing on balancing economic, environmental, and societal needs. The course examines technological advances, regulatory frameworks, and case studies, aimed at equipping students with the knowledge and skills necessary for effective water management in mining operations.

13.2.Introduction to Mining Water Management Overview of water use in mining operations, including extraction, processing, and remediation. Discusses the significance of integrated water management and its role in sustainable mining.

13.2.Water Resource Evaluation and Planning Methods for evaluating water resources at mining sites, including hydrological assessments and water balance studies. Covers planning frameworks for sustainable water management.

13.3.Water Quality Management in Mining Techniques for monitoring and managing water quality in mining contexts, including treatment technologies and pollution control measures.

13.4.Regulatory and Environmental Compliance An overview of legal frameworks and environmental regulations affecting water use in mining. Discusses compliance strategies and reporting requirements.

13.5.Innovation and Technology in Water Management Examination of advanced technologies and innovative

approaches in water management, such as desalination, water recycling, and smart water systems.

13.6.Stakeholder Engagement and Social License The importance of engaging with stakeholders and communities regarding water management in mining. Covers strategies for maintaining a social license to operate.

13.7..Climate Change Impacts on Water Resources Analyzes the effects of climate change on water availability and management in mining operations. Discusses adaptation strategies for minimizing risks.

13.8.Case Studies and Best Practices Review of real-world examples of successful water management in mining operations. Discusses lessons learned and best practices in the industry.

13.7.Future Trends in Mining Water Management Explores anticipated future developments in water management technologies and policies in mining.

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Key Topics: • Water Use in Mining: Understanding the various stages of water use in mining operations, from extraction to processing and remediation.

• Integrated Water Management: The importance of a holistic approach to managing water resources sustainably.

• Significance in Sustainable Mining: How integrated water management contributes to sustainable mining practices.

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Key Topics: • Hydrological Assessments: Techniques for assessing the availability and quality of water resources at mining sites.

• Water Balance Studies: Understanding the inputs and outputs of water within mining operations.

• Planning Frameworks: Developing comprehensive plans for sustainable water management.

13.4 Water Quality Management in Mining Techniques for monitoring and managing water quality in mining contexts, including treatment technologies and pollution control measures.

Key Topics: • Water Quality Monitoring: Methods for regularly assessing water quality.

• Treatment Technologies: Exploring technologies for treating contaminated water in mining operations.

• Pollution Control: Strategies for preventing and controlling pollution in mining environments.

13.5 Regulatory and Environmental Compliance An overview of legal frameworks and environmental regulations affecting water use in mining. Discusses compliance strategies and reporting requirements.

Key Topics: • Legal Frameworks: Understanding the regulations governing water use in mining.

• Environmental Compliance: Ensuring mining operations adhere to environmental standards.

• Reporting Requirements: Developing strategies for meeting regulatory reporting obligations.

13.6 Innovation and Technology in Water Management Examination of advanced technologies and innovative approaches in water management, such as desalination, water recycling, and smart water systems.

Key Topics: • Desalination: Using desalination technology to provide fresh water for mining operations.

• Water Recycling: Implementing recycling systems to reduce water consumption.

• Smart Water Systems: Leveraging digital technologies to optimize water management.

13.7 Stakeholder Engagement and Social License The importance of engaging with stakeholders and communities regarding water management in mining. Covers strategies for maintaining a social license to operate.

Key Topics: • Stakeholder Engagement: Techniques for effectively engaging with stakeholders.

• Community Involvement: Involving local communities in water management decisions.

• Social License to Operate: Building and maintaining trust with stakeholders.

13.8 Climate Change Impacts on Water Resources Analyzes the effects of climate change on water availability and management in mining operations. Discusses adaptation strategies for minimizing risks.

Key Topics: • Climate Change Effects: Understanding how climate change impacts water resources in mining.

• Adaptation Strategies: Developing strategies to adapt to changing water availability.

• Risk Minimization: Implementing measures to minimize risks associated with climate change.

13.9 Case Studies and Best Practices Review of real-world examples of successful water management in mining operations. Discusses lessons learned and best practices in the industry.

Key Topics: • Successful Case Studies: Examining examples of effective water management in mining.

• Lessons Learned: Identifying key takeaways from real-world cases.

• Best Practices: Establishing best practices for water management in mining.

13.10 Future Trends in Mining Water Management Explores anticipated future developments in water management technologies and policies in mining.

Key Topics: • Emerging Technologies: Investigating new technologies for water management.

• Policy Developments: Understanding how policies may evolve to support sustainable water management.

• Future Directions: Exploring potential future trends in water management for mining.

These courses provide a comprehensive understanding of integrated water management in the mining industry, equipping students with the knowledge and skills necessary for sustainable and effective water management practices.

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14.topic

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• Reporting Requirements: Developing strategies for meeting regulatory reporting obligations.

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• Smart Water Systems: Leveraging digital technologies to optimize water management.

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• Community Involvement: Involving local communities in water management decisions.

• Social License to Operate: Building and maintaining trust with stakeholders.

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• Risk Minimization: Implementing measures to minimize risks associated with climate change.

14.8 Case Studies and Best Practices Review of real-world examples of successful water management in mining operations. Discusses lessons learned and best practices in the industry.

Key Topics: • Successful Case Studies: Examining examples of effective water management in mining.

• Lessons Learned: Identifying key takeaways from real-world cases.

• Best Practices: Establishing best practices for water management in mining.

14.9 Future Trends in Mining Water Management Explores anticipated future developments in water management technologies and policies in mining.

Key Topics: • Emerging Technologies: Investigating new technologies for water management.

• Policy Developments: Understanding how policies may evolve to support sustainable water management.

• Future Directions: Exploring potential future trends in water management for mining.

These courses provide a comprehensive understanding of integrated water management in the mining industry, equipping students with the knowledge and skills necessary for sustainable and effective water management practices.

If you need more details or specific information on any of these topics, feel free to ask!

15.topics

4.1 .12.15..15.1.Advanced Manufacturing Techniques in Genetic Engineering This course explores the convergence of manufacturing processes and genetic engineering advancements, focusing on the development, production, and application of genetically engineered products. Students will gain deep insights into techniques used to enhance manufacturing processes in biotechnology and genetic engineering fields.

15.2.Introduction to Genetic Engineering Provides a foundational understanding of genetic engineering principles, techniques, and its application in various fields including biotechnology.

15.3..Manufacturing Processes in Biotechnology Covers traditional and innovative manufacturing processes used in biotechnology, essential for producing genetically modified organisms and compounds.

15.4..CRISPR and Advanced Genetic Modification Techniques An in-depth look at cutting-edge genetic modification techniques such as CRISPR, which are revolutionizing genetic engineering and manufacturing.

15.5.Ethical and Regulatory Considerations Discusses the ethical dilemmas and regulatory framework governing genetic engineering and manufacturing processes.

15.6.Biopharmaceutical Manufacturing Explores the manufacturing techniques specific to biopharmaceuticals produced through genetic engineering.

15.7.Fermentation Technology Focuses on fermentation processes used in manufacturing biologically engineered products.

15.8..Scale-Up and Commercialization Discusses the challenges and strategies involved in scaling genetic engineering products from laboratory to market.

15.9.Quality Control in Genetically Engineered Products Examines the quality control methodologies specific to genetic engineering industries.

15.10.Future Trends in Genetic Engineering Manufacturing Looks ahead at emerging trends and technologies that are poised to influence the genetic engineering and manufacturing landscape.

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15.10.Future Trends in Genetic Engineering Manufacturing Looks ahead at emerging trends and technologies that are poised to influence the genetic engineering and manufacturing landscape.

16.topics

4.1 .12.15.16.1.Data Processing and Hosting Services in Computer Engineering This course is designed for graduate students pursuing a Master's degree in Computer Engineering with a focus on data processing and hosting services. It explores the advanced concepts, methodologies, and applications in managing and processing vast amounts of data, and the technological infrastructure in hosting services necessary to support such activities.

16.2.Introduction to Data Processing An overview of data processing concepts including data collection, cleaning, transformation, and storage.

16.3.Cloud Hosting Services Understanding cloud hosting fundamentals including types of cloud services, deployment models, and scalability.

16.4..Big Data Technologies Exploring the tools and technologies used for processing and managing big data such as Hadoop and Spark.

16.5Data Security in Cloud Hosting An in-depth look into data security practices in cloud hosting environments, including encryption and access management.

16.6.Containerization and Microservices Understanding containerization technologies like Docker and Kubernetes and their role in hosting services.

16.7Distributed Systems Study of distributed computing systems architecture, design, and management.

16.8.Data Warehousing and Analytics Techniques and tools used to design data warehouses and leverage analytics for business intelligence.

16.9..Serverless Computing Exploration of serverless computing models and their application in data hosting services.

4.1 .12.15..16.1 Data Processing and Hosting Services in Computer Engineering This course is designed for graduate students pursuing a Master's degree in Computer Engineering with a focus on data processing and hosting services. It explores the advanced concepts, methodologies, and applications in managing and processing vast amounts of data, and the technological infrastructure in hosting services necessary to support such activities.

16.2 Introduction to Data Processing An overview of data processing concepts including data collection, cleaning, transformation, and storage.

Key Topics: • Data Collection: Methods and tools for gathering data from various sources.

• Data Cleaning: Techniques for identifying and correcting errors in data sets.

• Data Transformation: Processes for converting data into a usable format.

• Data Storage: Solutions for storing large volumes of data efficiently.

16.3 Cloud Hosting Services Understanding cloud hosting fundamentals including types of cloud services, deployment models, and scalability.

Key Topics: • Types of Cloud Services: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS).

• Deployment Models: Public cloud, private cloud, and hybrid cloud.

• Scalability: Techniques for scaling cloud resources to meet demand.

16.4 Big Data Technologies Exploring the tools and technologies used for processing and managing big data such as Hadoop and Spark.

Key Topics: • Hadoop: Overview of the Hadoop ecosystem and its components.

• Spark: Understanding Apache Spark and its use in big data processing.

• Big Data Frameworks: Comparing different frameworks and their applications.

16.5 Data Security in Cloud Hosting An in-depth look into data security practices in cloud hosting environments, including encryption and access management.

Key Topics: • Encryption: Techniques for encrypting data at rest and in transit.

• Access Management: Strategies for managing user access and permissions.

• Security Protocols: Implementing security protocols to protect data in the cloud.

16.6 Containerization and Microservices Understanding containerization technologies like Docker and Kubernetes and their role in hosting services.

Key Topics: • Docker: Basics of Docker and containerization.

• Kubernetes: Orchestration of containerized applications using Kubernetes.

• Microservices Architecture: Designing applications using microservices for scalability and flexibility.

16.7 Distributed Systems Study of distributed computing systems architecture, design, and management.

Key Topics: • Distributed Computing: Principles and challenges of distributed systems.

• System Architecture: Designing and managing distributed system architectures.

• Consistency and Fault Tolerance: Ensuring consistency and reliability in distributed environments.

16.8 Data Warehousing and Analytics Techniques and tools used to design data warehouses and leverage analytics for business intelligence.

Key Topics: • Data Warehousing: Design and implementation of data warehouses.

• ETL Processes: Extract, Transform, Load processes for data warehousing.

• Business Intelligence: Leveraging analytics for decision-making and insights.

16.9 Serverless Computing Exploration of serverless computing models and their application in data hosting services.

Key Topics: • Serverless Models: Understanding Function as a Service (FaaS) and Backend as a Service (BaaS).

• Benefits of Serverless: Scalability, cost-efficiency, and simplified management.

• Use Cases: Real-world applications of serverless computing.

These topics provide a comprehensive understanding of data processing and hosting services in computer engineering, equipping students with the knowledge and skills to manage and process vast amounts of data effectively.

If you have any specific questions or need more details on a

17.topics

4.1 .12.15..17.1.Masters in Cryptocurrency and Blockchain Applications This course provides an in-depth exploration of blockchain technology and digital currency. Students will learn about the foundational principles of the blockchain, the development and application of cryptocurrencies, and various real-world applications. Emphasis will be placed on developing a practical understanding of blockchain software, digital currency markets, and smart contracts.

17.2.Introduction to Blockchain Technology Learn the fundamentals of blockchain technology, including its history, key concepts, and how it differs from traditional databases.

17.2.Cryptocurrencies: An Overview Understand the various types of cryptocurrencies, their functions, and the economics underlying digital currencies.

17.3.Blockchain Consensus Mechanisms Explore how consensus mechanisms like Proof of Work, Proof of Stake, and others operate within blockchain networks.

17.4..Smart Contracts Learn about smart contracts, their capabilities, use cases, and limitations. Understand how they are deployed and managed on blockchain networks.

17.5.Decentralized Finance (DeFi) Explore the growth of DeFi platforms and how they are revolutionizing traditional financial systems.

17.6.Blockchain in Supply Chain Management Understand how blockchain technology is applied in supply chain management to enhance transparency and efficiency.

17.7.Regulation and Compliance in Blockchain Study the regulatory landscape surrounding blockchain technology and cryptocurrencies, including the challenges and opportunities involved.

17.8.NFTs and Digital Assets Explore the world of Non-Fungible Tokens (NFTs), their creation, market dynamics, and how they impact digital ownership and media.

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17.2 Introduction to Blockchain Technology Learn the fundamentals of blockchain technology, including its history, key concepts, and how it differs from traditional databases.

Key Topics: • History of Blockchain: Tracing the origins and evolution of blockchain technology.

• Key Concepts: Understanding blocks, chains, nodes, and consensus mechanisms.

• Differences from Traditional Databases: Comparing blockchain to centralized databases in terms of

structure, security, and transparency.

17.3 Cryptocurrencies: An Overview Understand the various types of cryptocurrencies, their functions, and the economics underlying digital currencies.

Key Topics: • Types of Cryptocurrencies: Bitcoin, Ethereum, altcoins, and stablecoins.

• Functions of Cryptocurrencies: Medium of exchange, store of value, and investment asset.

• Economics of Digital Currencies: Supply, demand, market capitalization, and price volatility.

17.4 Blockchain Consensus Mechanisms Explore how consensus mechanisms like Proof of Work, Proof of Stake, and others operate within blockchain networks.

Key Topics: • Proof of Work (PoW): Understanding the mining process, energy consumption, and security.

• Proof of Stake (PoS): Staking, validators, and energy efficiency.

• Alternative Consensus Mechanisms: Delegated Proof of Stake (DPoS), Practical Byzantine Fault Tolerance (PBFT), and more.

17.5 Smart Contracts Learn about smart contracts, their capabilities, use cases, and limitations. Understand how they are deployed and managed on blockchain networks.

Key Topics: • Definition and Functionality: What smart contracts are and how they work.

• Use Cases: Applications in finance, supply chain, real estate, and other industries.

• Limitations: Challenges such as scalability, security vulnerabilities, and legal considerations.

17.6 Decentralized Finance (DeFi) Explore the growth of DeFi platforms and how they are revolutionizing traditional financial systems.

Key Topics: • Overview of DeFi: Understanding the principles and goals of decentralized finance.

• DeFi Platforms: Popular platforms like Uniswap, Aave, and Compound.

• Impact on Traditional Finance: How DeFi is transforming lending, borrowing, trading, and asset management.

17.7 Blockchain in Supply Chain Management Understand how blockchain technology is applied in supply chain management to enhance transparency and efficiency.

Key Topics: • Transparency and Traceability: How blockchain improves visibility and tracking in supply chains.

• Efficiency Improvements: Reducing fraud, errors, and delays in supply chain processes.

• Case Studies: Real-world examples of blockchain applications in supply chain management.

17.8 Regulation and Compliance in Blockchain Study the regulatory landscape surrounding blockchain technology and cryptocurrencies, including the challenges and opportunities involved.

Key Topics: • Regulatory Frameworks: Understanding the legal regulations governing blockchain and cryptocurrencies.

• Compliance Requirements: Ensuring compliance with anti-money laundering (AML) and know your customer (KYC) regulations.

• Challenges and Opportunities: Navigating the evolving regulatory environment and its impact on the blockchain industry.

17.9 NFTs and Digital Assets Explore the world of Non-Fungible Tokens (NFTs), their creation, market

dynamics, and how they impact digital ownership and media.

Key Topics: • Introduction to NFTs: Understanding what NFTs are and how they work.

• Market Dynamics: Trends, marketplaces, and the economic aspects of NFTs.

• Impact on Digital Ownership: How NFTs are changing the landscape of digital art, collectibles, and intellectual property.

These topics provide a comprehensive understanding of cryptocurrency and blockchain applications, equipping students with the knowledge and skills to innovate and lead in this rapidly evolving field.

18 topic

4.1 .12.15.18.1.Advanced Cybersecurity in Bibliotechnology This course explores the intersection of cybersecurity and bibliotechnology, focusing on protecting digital library systems, data privacy, and integrity in library networks. Students will learn about cybersecurity principles and practices specifically tailored for bibliotechnology, ensuring the safety and security of digital libraries and bibliographic databases.

18.2.Introduction to Cybersecurity in Bibliotechnology An overview of the basic principles of cybersecurity and their importance in the domain of bibliotechnology.

18.3Threats and Vulnerabilities in Digital Libraries Understanding the common cybersecurity threats and vulnerabilities unique to digital

18.4.Data Privacy and Integrity in Bibliotechnology Exploring techniques to ensure data privacy and maintain data integrity for library users and their digital interactions.

18.5.Implementing Security Policies for Digital Libraries Developing and applying security policies and frameworks tailored for digital libraries to safeguard information assets.

18.6.Access Control in Library Networks Examining access control mechanisms to secure user authentication and authorization within library systems.

18.7.Digital Rights Management in Bibliotechnology Understanding digital rights management and its role in protecting digital content in bibliotechnology.

18.8.Network Security Essentials for Digital Libraries Learn the essentials of securing library networks, combating network-based threats, and implementing robust network security measures.

18.9.Incident Response and Recovery for Digital Libraries Strategies for effectively responding to and recovering from cybersecurity incidents within digital library environments.

18..10Emerging Cybersecurity Technologies in Bibliotechnology Explore the role of emerging technologies like AI and blockchain in enhancing cybersecurity in bibliotechnology.

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18.2 Introduction to Cybersecurity in Bibliotechnology An overview of the basic principles of cybersecurity and their importance in the domain of bibliotechnology.

Key Topics: • Cybersecurity Principles: Basic concepts of cybersecurity such as confidentiality, integrity, and availability.

• Importance in Bibliotechnology: Understanding why cybersecurity is crucial for digital libraries and bibliographic databases.

• Common Cyber Threats: Identifying typical cyber threats that can affect bibliotechnological systems.

18.3 Threats and Vulnerabilities in Digital Libraries Understanding the common cybersecurity threats and vulnerabilities unique to digital libraries.

Key Topics: • Threat Landscape: Overview of threats such as malware, phishing, and ransomware.

• Vulnerabilities: Identifying and assessing vulnerabilities specific to digital library systems.

• Risk Assessment: Techniques for evaluating and mitigating risks in digital libraries.

18.4 Data Privacy and Integrity in Bibliotechnology Exploring techniques to ensure data privacy and maintain data integrity for library users and their digital interactions.

Key Topics: • Data Privacy Techniques: Implementing privacy measures such as anonymization and encryption.

• Data Integrity: Ensuring that data remains accurate and unaltered through checksums and hashes.

• User Data Protection: Protecting sensitive information related to library users.

18.5 Implementing Security Policies for Digital Libraries Developing and applying security policies and frameworks tailored for digital libraries to safeguard information assets.

Key Topics: • Policy Development: Crafting comprehensive security policies for digital libraries.

• Frameworks: Utilizing existing security frameworks like ISO/IEC 27001.

• Policy Enforcement: Strategies for enforcing and maintaining security policies.

18.6 Access Control in Library Networks Examining access control mechanisms to secure user authentication and authorization within library systems.

Key Topics: • Authentication Methods: Techniques such as passwords, biometrics, and multi-factor authentication.

• Authorization: Ensuring proper access controls and role-based access within library networks.

• Access Management Tools: Using tools and software to manage access controls effectively.

18.7 Digital Rights Management in Bibliotechnology Understanding digital rights management (DRM) and its role in protecting digital content in bibliotechnology.

Key Topics: • DRM Principles: Basic concepts and purposes of DRM.

• DRM Technologies: Tools and technologies used for implementing DRM in digital libraries.

• Content Protection: Strategies for protecting digital content from unauthorized access and distribution.

18.8 Network Security Essentials for Digital Libraries Learn the essentials of securing library networks, combating network-based threats, and implementing robust network security measures.

Key Topics: • Network Security Fundamentals: Understanding firewalls, intrusion detection/prevention systems, and VPNs.

• Network Threats: Identifying and mitigating threats such as DDoS attacks and man-in-the-middle attacks.

• Security Measures: Best practices for securing network infrastructure in digital libraries.

18.9 Incident Response and Recovery for Digital Libraries Strategies for effectively responding to and recovering from cybersecurity incidents within digital library environments.

Key Topics: • Incident Response Planning: Developing and implementing incident response plans.

• Recovery Techniques: Strategies for recovering data and services after a cybersecurity incident.

• Post-Incident Analysis: Conducting root cause analysis and improving security measures.

18.10 Emerging Cybersecurity Technologies in Bibliotechnology Explore the role of emerging technologies like AI and other advanced tools in enhancing cybersecurity in bibliotechnology.

Key Topics: • AI in Cybersecurity: Utilizing artificial intelligence for threat detection and response.

• Blockchain Technology: Applying blockchain for secure and transparent data management.

• Future Trends: Exploring future trends and advancements in cybersecurity technologies.

These courses provide a comprehensive understanding of advanced cybersecurity principles and practices in the context of bibliotechnology, preparing students to protect digital libraries and bibliographic databases effectively

19 topics

4.1 .12.15..19.1.1Edge Computing in Modern Power and Energy Systems This course provides an in-depth exploration of edge computing technologies and their integration into modern power and energy systems. Students will learn about the principles of edge computing and how it can optimize energy distribution, improve grid reliability, and enhance energy management. The course covers various topics such as distributed computing, real-time data processing, IoT in energy systems, and security challenges.

19.2..Introduction to Edge Computing An overview of edge computing and its significance in the modern power and energy sectors. It covers the basics of edge nodes, latency reduction, and system efficiency.

19.3.Distributed Computing in Energy Systems Explores how distributed computing operates in energy systems to enhance performance, reliability, and efficiency.

19.4.IoT Applications in Power Systems Discusses the role of IoT devices in modern power systems for data collection, analysis, and decision-making.

19.5.Real-time Data Processing Focuses on techniques for real-time data processing at the edge, including algorithms and architectures suited for energy systems.

19.6Security and Privacy in Edge Computing Examines the security challenges in edge computing environments and how they impact energy systems, with strategies for mitigation.

19.6.Edge Analytics for Energy Management Investigates the use of edge analytics for optimizing energy management through predictive analytics and machine learning.

19.7.Energy Efficiency Optimization Covers strategies for improving energy efficiency through edge computing technologies and smart grids.

19.8.Case Studies on Edge Computing in Energy Presents real-world case studies to illustrate the deployment and impact of edge computing in energy systems.

19.9.Future Trends in Edge Computing for Energy Systems Explores future developments and potential advancements in edge computing applicable to power and energy systems.

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power and energy sectors. It covers the basics of edge nodes, latency reduction, and system efficiency.

Key Topics: • Edge Nodes: Understanding the role of edge nodes in data processing.

• Latency Reduction: Techniques to reduce latency and improve response times.

• System Efficiency: Enhancing overall system efficiency through edge computing.

19.3 Distributed Computing in Energy Systems Explores how distributed computing operates in energy systems to enhance performance, reliability, and efficiency.

Key Topics: • Distributed Computing Principles: Basics of distributed computing and its application in energy systems.

• Performance Enhancement: Improving system performance through distributed computing.

• Reliability and Efficiency: Ensuring system reliability and operational efficiency.

19.4 IoT Applications in Power Systems Discusses the role of IoT devices in modern power systems for data collection, analysis, and decision-making.

Key Topics: • IoT Devices: Types and functions of IoT devices in power systems.

• Data Collection and Analysis: Leveraging IoT for real-time data collection and analysis.

• Decision-Making: Enhancing decision-making processes using IoT data.

19.5 Real-time Data Processing Focuses on techniques for real-time data processing at the edge, including algorithms and architectures suited for energy systems.

Key Topics: • Real-time Processing Techniques: Algorithms and architectures for real-time data processing.

• Edge Processing: Advantages and challenges of processing data at the edge.

• Application in Energy Systems: Implementing real-time data processing in energy management.

19.6 Security and Privacy in Edge Computing Examines the security challenges in edge computing environments and how they impact energy systems, with strategies for mitigation.

Key Topics: • Security Challenges: Identifying security threats in edge computing environments.

• Privacy Concerns: Ensuring data privacy in distributed systems.

• Mitigation Strategies: Techniques for mitigating security and privacy risks.

19.7 Edge Analytics for Energy Management Investigates the use of edge analytics for optimizing energy management through predictive analytics and machine learning.

Key Topics: • Edge Analytics: Understanding edge analytics and its benefits.

• Predictive Analytics: Using predictive analytics for proactive energy management.

• Machine Learning: Applying machine learning models to enhance energy efficiency.

19.8 Energy Efficiency Optimization Covers strategies for improving energy efficiency through edge computing technologies and smart grids.

Key Topics: • Energy Optimization Techniques: Methods for optimizing energy use.

• Smart Grids: Role of smart grids in energy efficiency.

• Integration with Edge Computing: How edge computing enhances energy optimization efforts.

19.9 Case Studies on Edge Computing in Energy Presents real-world case studies to illustrate the deployment and impact of edge computing in energy systems.

Key Topics: • Case Studies: Examples of successful edge computing implementations.

• Deployment Challenges: Overcoming challenges in deploying edge computing solutions.

• Impact Assessment: Evaluating the impact of edge computing on energy management.

19.10 Future Trends in Edge Computing for Energy Systems Explores future developments and potential advancements in edge computing applicable to power and energy systems.

Key Topics: • Emerging Technologies: Future technologies that could shape edge computing.

• Trends in Energy Systems: Anticipating trends and advancements in energy management.

• Research and Development: Ongoing and future research initiatives in edge computing.

These courses provide a comprehensive understanding of edge computing in modern power and energy systems, equipping students with the knowledge and skills to optimize energy distribution, improve grid reliability, and enhance energy management.

If you have any specific questions or need more details on any of these topics, feel free to ask!

Edge Computing for Modern Power and Energy Systems This advanced course explores the role and integration of edge computing technologies in modern power and energy systems. The syllabus covers fundamental concepts, applications, and the impact of edge computing in enhancing efficiency, reliability, and sustainability in energy systems. Students will learn through theoretical insights and practical applications, supplemented by interactive resources.

Introduction to Edge Computing Understanding the basic concepts and architecture of edge computing, its significance in reducing latency and improving real-time processing capabilities in power systems.

Role of Edge Computing in Smart Grids Exploring how edge computing supports smart grid operations including demand response, grid stability, and energy distribution management.

Edge Computing for Renewable Energy Integration Analyzing the integration of renewable energy sources into power grids using edge computing to enhance efficiency and sustainability.

Data Management and Security in Edge Computing Understanding how data is managed and secured in edge computing systems, with a focus on the challenges and solutions in power systems.

Machine Learning Applications on the Edge Investigating the applications of machine learning in edge devices to predict and optimize energy consumption and distribution.

Case Studies in Edge Computing for Energy Systems Reviewing real-world case studies to understand the implementation and outcomes of edge computing in energy systems.

Challenges and Future Trends Discussing the current challenges faced by edge computing in energy systems and predicting future trends and technological advancements.

20 topics

4.1 .12.15..20.1.Masters in Cyber-Physical Systems and Information Technology This course provides an in-depth understanding of Cyber-Physical Systems (CPS) within the realm of Information Technology. By exploring the convergence of physical and cyber domains, students will gain insights into the integration, design, and application of CPS in various sectors. Through a combination of theoretical studies and practical assignments, this course aims to equip students with the skills necessary to innovate in this rapidly evolving field.

20.2.Introduction to Cyber-Physical Systems This topic covers the basics of CPS, including definitions, history, and key concepts that distinguish CPS from traditional IT systems.

20.3.Architecture of CPS Explore the architecture of CPS, focusing on sensors, actuators, control systems, and the role of internet of things (IoT) in CPS.

20.4Networking and Communication in CPS Understand the communication protocols and networks that enable interaction between cyber and physical components within CPS.

20.5.CPS Security and Privacy This topic delves into the security challenges in CPS and discusses methods to ensure data integrity and privacy.

20.6.Machine Learning in CPS Examine the role of machine learning in optimizing the performance and decision-making processes within CPS.

20.7.Real-Time Systems and CPS Learn about the real-time requirements of CPS and the design considerations necessary to meet these requirements.

20.8.Simulation and Modeling in CPS Explore tools and methodologies for simulating and modeling CPS to optimize design and operation.

20.9..Applications and Case Studies of CPS Analyze various applications of CPS in industries like healthcare, automotive, and smart grids with real-world case studies.

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20.2 Introduction to Cyber-Physical Systems This topic covers the basics of CPS, including definitions, history, and key concepts that distinguish CPS from traditional IT systems.

Key Topics: • Definitions: Understanding what CPS are and how they operate.

• History: Tracing the development and evolution of CPS.

• Key Concepts: Exploring the unique attributes of CPS, such as real-time computing and system integration.

20.3 Architecture of CPS Explore the architecture of CPS, focusing on sensors, actuators, control systems, and the role of the Internet of Things (IoT) in CPS.

Key Topics: • Sensors and Actuators: Understanding their roles and how they interact within CPS.

• Control Systems: Examining the mechanisms that manage and control physical processes.

• IoT Integration: The role of IoT in enhancing CPS functionality and connectivity.

20.4 Networking and Communication in CPS Understand the communication protocols and networks that enable interaction between cyber and physical components within CPS.

Key Topics: • Communication Protocols: Exploring various protocols used in CPS for data transmission.

• Network Architecture: Designing and managing networks to support CPS operations.

• Data Exchange: Ensuring efficient and secure data exchange between components.

20.5 CPS Security and Privacy This topic delves into the security challenges in CPS and discusses methods to

ensure data integrity and privacy.

Key Topics: • Security Challenges: Identifying and addressing vulnerabilities in CPS.

• Data Integrity: Techniques for ensuring the accuracy and reliability of data.

• Privacy Measures: Protecting sensitive information within CPS environments.

20.6 Machine Learning in CPS Examine the role of machine learning in optimizing the performance and decision-making processes within CPS.

Key Topics: • Machine Learning Algorithms: Applying algorithms to enhance CPS functionality.

• Optimization: Using machine learning for predictive maintenance and performance improvement.

• Decision-Making: Enhancing automated decision-making processes in CPS.

20.7 Real-Time Systems and CPS Learn about the real-time requirements of CPS and the design considerations necessary to meet these requirements.

Key Topics: • Real-Time Computing: Understanding the principles of real-time systems.

• Design Considerations: Ensuring CPS can meet strict timing constraints.

• Application Scenarios: Real-world examples of real-time CPS applications.

20.8 Simulation and Modeling in CPS Explore tools and methodologies for simulating and modeling CPS to optimize design and operation.

Key Topics: • Simulation Tools: Overview of tools used for CPS simulation.

• Modeling Techniques: Creating accurate models of CPS for analysis and optimization.

• Design Optimization: Using simulations to improve CPS design and performance.

20.9 Applications and Case Studies of CPS Analyze various applications of CPS in industries like healthcare, automotive, and smart grids with real-world case studies.

Key Topics: • Industry Applications: Exploring how CPS are applied in different sectors.

• Case Studies: Reviewing successful implementations and their outcomes.

• Lessons Learned: Understanding the challenges and solutions in real-world CPS projects.

These courses provide a comprehensive understanding of Cyber-Physical Systems and their integration within Information Technology, equipping students with the skills to innovate and lead in this rapidly evolving field.

21 topics

4.1 .12.15.21.1.Masters in Distributed-Ledger Technology Applications in Educational Technology This course explores the integration of distributed ledger technologies (DLT), such as blockchain, into educational technology platforms. Students will learn about DLT concepts, their applications in the management and dissemination of educational content, secure credentialing, and enhancing educational efficiencies. The course equips students with both theoretical understanding and practical skills to innovate within the educational sector using advanced DLT methodologies.

21.1. Introduction to Distributed Ledger Technology An overview of distributed ledger technology including blockchain, its history, and basic principles that empower decentralized systems.

21.2.The Need for Distributed Ledger Technology in Education Examine the challenges in the current educational systems and how DLT can address issues around data security, integrity, and cost-efficiency.

21.3.Blockchain for Secure Credentialing Explore how blockchain can be used for secure credentialing, providing reliable storage and easy verification of educational credentials.

21.4.Smart Contracts in Educational Transactions Learn about smart contracts and how they can optimize and automate payment systems, enrollments, and certifications in education.

21.5..DLT-based Learning Management Systems Investigate the potential of DLT to revolutionize Learning Management Systems (LMS) by enabling decentralized data management and analytics.

Privacy and Data Security in DLT Understand the privacy considerations and security protocols of DLT systems and how data privacy is enhanced within educational contexts.

21.6.Case Studies of DLT in Education Review real-world implementations of DLT in education and analyze the outcomes and lessons learned from these case studies.

21.7.Future Trends in DLT and EdTech Delve into the emerging trends and future directions of DLT applications in educational technology.

21.1 Masters in Distributed-Ledger Technology Applications in Educational Technology This course explores the integration of distributed ledger technologies (DLT), such as blockchain, into educational technology platforms. Students will learn about DLT concepts, their applications in the management and dissemination of educational content, secure credentialing, and enhancing educational efficiencies. The course equips students with both theoretical understanding and practical skills to innovate within the educational sector using advanced DLT methodologies.

21.2 Introduction to Distributed Ledger Technology An overview of distributed ledger technology including blockchain, its history, and basic principles that empower decentralized systems.

Key Topics: • History of DLT: Understanding the origins and evolution of distributed ledger technology.

• Basic Principles: Exploring the core principles of decentralization, transparency, and immutability.

• Blockchain Technology: Introduction to blockchain and how it functions as a distributed ledger.

21.3 The Need for Distributed Ledger Technology in Education Examine the challenges in the current educational systems and how DLT can address issues around data security, integrity, and cost-efficiency.

Key Topics: • Current Challenges: Identifying problems such as data breaches, fraud, and inefficiencies.

• DLT Solutions: How distributed ledger technology can enhance data security, ensure data integrity, and reduce costs.

• Case Examples: Real-world scenarios where DLT has been implemented in education.

21.4 Blockchain for Secure Credentialing Explore how blockchain can be used for secure credentialing, providing reliable storage and easy verification of educational credentials.

Key Topics: • Credentialing Issues: Understanding the issues with traditional credentialing methods.

• Blockchain Solutions: How blockchain ensures secure and tamper-proof credentialing.

• Verification: The process of verifying educational credentials using blockchain.

21.5 Smart Contracts in Educational Transactions Learn about smart contracts and how they can optimize and automate payment systems, enrollments, and certifications in education.

Key Topics: • Smart Contracts: Understanding what smart contracts are and how they work.

• Applications in Education: Using smart contracts for automating payments, enrollments, and certifications.

• Benefits and Challenges: Exploring the advantages and potential challenges of implementing smart

Benefits and Challenges: Exploring the advantages and potential challenges of implementing smart contracts in education.

21.6 DLT-based Learning Management Systems Investigate the potential of DLT to revolutionize Learning Management Systems (LMS) by enabling decentralized data management and analytics.

Key Topics: • DLT Integration: How distributed ledger technology can be integrated into LMS.

• Decentralized Data Management: Benefits of decentralized data management for educational institutions.

• Analytics: Leveraging DLT for enhanced data analytics and insights.

21.7 Privacy and Data Security in DLT Understand the privacy considerations and security protocols of DLT systems and how data privacy is enhanced within educational contexts.

Key Topics: • Privacy Protocols: Implementing privacy protocols in DLT systems.

• Data Security: Ensuring the security of data stored and managed on distributed ledgers.

• Educational Contexts: Specific considerations for enhancing data privacy in educational environments.

21.8 Case Studies of DLT in Education Review real-world implementations of DLT in education and analyze the outcomes and lessons learned from these case studies.

Key Topics: • Case Studies: Detailed analysis of successful DLT implementations in educational settings.

• Outcomes: Understanding the impact of DLT on educational processes.

• Lessons Learned: Key takeaways and best practices from real-world examples.

21.9 Future Trends in DLT and EdTech Delve into the emerging trends and future directions of DLT applications in educational technology.

Key Topics: • Emerging Trends: Identifying new and upcoming trends in DLT and EdTech.

• Future Directions: Exploring potential future developments in DLT applications for education.

• Research and Innovation: Current and future research initiatives in the field of DLT and educational technology.

These courses provide a comprehensive understanding of distributed ledger technology applications in educational technology, equipping students with the knowledge and skills to innovate and lead in this rapidly evolving field.

22 topics

4.1 .12.15.22.1.Master's in Adult Education Services This course is designed for educators and professionals aspiring to excel in the field of adult education. It focuses on teaching strategies, curriculum design, assessment methods, and the unique needs and challenges faced by adult learners. The course aims to prepare students to effectively design and implement educational programs that cater to adult learners in various settings.

22.1.Introduction to Adult Education An overview of the principles and practices in adult education, including historical perspectives and modern developments.

22.2.Theories of Adult Learning Exploration of key theories such as Andragogy, Transformative Learning, and Experiential Learning that inform adult education practices.

22.3.Curriculum Design for Adult Learners Techniques and strategies for developing effective curricula tailored to adult learners' needs and goals.

22.4.Assessment and Evaluation in Adult Education Methods for assessing adult learners' progress and

22.4.Assessment and Evaluation in Adult Education Methods for assessing adult learners' progress and program effectiveness, including formative and summative evaluation.

22.5.Technology Integration in Adult Learning Utilizing digital tools and technologies to enhance adult learning experiences.

22.6.Diversity and Inclusion in Adult Education Addressing the diverse backgrounds, identities, and learning styles of adult learners.

22.7.Motivational Strategies for Adult Learners Strategies to engage and motivate adult learners, fostering a positive and productive learning environment.

22.8.Professional Development for Adult Educators Resources and strategies for ongoing professional growth and development in adult education.-

22.1 Master's in Adult Education Services This course is designed for educators and professionals aspiring to excel in the field of adult education. It focuses on teaching strategies, curriculum design, assessment methods, and the unique needs and challenges faced by adult learners. The course aims to prepare students to effectively design and implement educational programs that cater to adult learners in various settings.

22.2 Introduction to Adult Education An overview of the principles and practices in adult education, including historical perspectives and modern developments.

Key Topics: • Principles of Adult Education: Understanding the foundational principles guiding adult education.

• Historical Perspectives: Tracing the evolution of adult education practices.

• Modern Developments: Exploring recent advancements and trends in adult education.

22.3 Theories of Adult Learning Exploration of key theories such as Andragogy, Transformative Learning, and Experiential Learning that inform adult education practices.

Key Topics: • Andragogy: Principles of adult learning introduced by Malcolm Knowles.

• Transformative Learning: How transformative experiences foster deep learning in adults.

• Experiential Learning: The role of hands-on experiences and reflection in adult learning.

22.4 Curriculum Design for Adult Learners Techniques and strategies for developing effective curricula tailored to adult learners' needs and goals.

Key Topics: • Needs Assessment: Identifying the learning needs of adult learners.

• Curriculum Planning: Creating structured and flexible curricula that accommodate adult learners.

• Instructional Strategies: Implementing various teaching methods to enhance learning.

22.5 Assessment and Evaluation in Adult Education Methods for assessing adult learners' progress and program effectiveness, including formative and summative evaluation.

Key Topics: • Formative Assessment: Techniques for ongoing assessment to support learning.

• Summative Evaluation: Evaluating learner outcomes at the end of a program.

• Program Effectiveness: Measuring the success and impact of adult education programs.

22.6 Technology Integration in Adult Learning Utilizing digital tools and technologies to enhance adult learning experiences.

Key Topics: • E-Learning Platforms: Using online platforms to deliver educational content.

• Blended Learning: Combining face-to-face and online learning methods.

• Tech Tools: Incorporating various digital tools to support teaching and learning.

22.7 Diversity and Inclusion in Adult Education Addressing the diverse backgrounds, identities, and learning styles of adult learners.

Key Topics: • Cultural Competence: Understanding and respecting cultural differences in the classroom.

• Inclusive Practices: Implementing strategies to create inclusive learning environments.

• Learning Styles: Adapting teaching methods to accommodate different learning styles.

22.8 Motivational Strategies for Adult Learners Strategies to engage and motivate adult learners, fostering a positive and productive learning environment.

Key Topics: • Motivational Theories: Exploring theories that explain adult learner motivation.

• Engagement Techniques: Practical strategies to keep adult learners engaged.

• Supportive Environment: Creating a learning environment that encourages persistence and success.

22.9 Professional Development for Adult Educators Resources and strategies for ongoing professional growth and development in adult education.

Key Topics: • Continuing Education: Opportunities for adult educators to enhance their skills and knowledge.

• Professional Networks: Building and leveraging networks for support and growth.

• Reflective Practice: Encouraging self-reflection to improve teaching practices.

These courses provide a comprehensive understanding of adult education services, equipping educators with the knowledge and skills to effectively design and implement programs tailored to adult learners.

23 topics

4.1 .12.15.23.1Quantum Computing in Systems Engineering This course provides an in-depth exploration of quantum computing principles and their applications within the field of systems engineering. Students will gain a comprehensive understanding of both theoretical foundations and practical implementations of quantum technologies in designing and optimizing complex systems.

23.1.Introduction to Quantum Computing An overview of the principles of quantum mechanics that form the basis of quantum computing technology, including qubits, superposition, and entanglement.

23.2.Quantum Algorithms Detailed study of key quantum algorithms such as Shor's algorithm and Grover's algorithm, and their implications for solving complex computational problems.

22.3.Quantum Gates and Circuits Exploration of fundamental quantum gates and the construction of quantum circuits to perform computational tasks using qubits.

22.4.Quantum Information Theory Understanding the theoretical underpinnings of how quantum mechanics enhances information processing capabilities in systems engineering.

22.5.Quantum Computing Platforms Introduction to current quantum computing platforms and hardware, including superconducting qubits and trapped ions.

22.6.Quantum Programming Languages Learning and applying quantum programming languages such as Qiskit, Cirq, and Q# to develop quantum algorithms.

22.7.Applications of Quantum Computing in Systems Engineering Investigation of potential applications of quantum computing in systems engineering, including optimization, simulation, and cryptography.

22.8.Challenges and Future of Quantum Computing Discussion on the current challenges facing the field of quantum computing and potential directions for future research and development.

22.9.Quantum Supremacy and its Implications Examination of the concept of quantum supremacy and its potential to revolutionize computing systems.

23.1 Quantum Computing in Systems Engineering This course provides an in-depth exploration of quantum computing principles and their applications within the field of systems engineering. Students will gain a comprehensive understanding of both theoretical foundations and practical implementations of quantum technologies in designing and optimizing complex systems.

23.1 Introduction to Quantum Computing An overview of the principles of quantum mechanics that form the basis of quantum computing technology, including qubits, superposition, and entanglement.

Key Topics: • Qubits: Understanding the basic unit of quantum information.

• Superposition: How qubits can exist in multiple states simultaneously.

• Entanglement: The phenomenon where qubits become interconnected and the state of one affects the state of another.

23.2 Quantum Algorithms Detailed study of key quantum algorithms such as Shor's algorithm and Grover's algorithm, and their implications for solving complex computational problems.

Key Topics: • Shor's Algorithm: How it factors large numbers exponentially faster than classical algorithms.

• Grover's Algorithm: Quantum search algorithm providing quadratic speedup.

• Implications: Potential applications in cryptography, optimization, and more.

23.3 Quantum Gates and Circuits Exploration of fundamental quantum gates and the construction of quantum circuits to perform computational tasks using qubits.

Key Topics: • Quantum Gates: Basic gates such as Pauli-X, Hadamard, and CNOT.

• Quantum Circuits: Building and understanding circuits composed of quantum gates.

• Quantum Operations: Executing operations and measuring results.

23.4 Quantum Information Theory Understanding the theoretical underpinnings of how quantum mechanics enhances information processing capabilities in systems engineering.

Key Topics: • Quantum Entropy: Measures of information and uncertainty in quantum systems.

• Quantum Error Correction: Techniques to protect quantum information from errors.

• Quantum Channels: Understanding communication channels in quantum information theory.

23.5 Quantum Computing Platforms Introduction to current quantum computing platforms and hardware, including superconducting qubits and trapped ions.

Key Topics: • Superconducting Qubits: How they work and their role in quantum computers.

• Trapped Ions: Another leading technology for building quantum computers.

• Quantum Hardware: Overview of different types of quantum computing hardware.

23.6 Quantum Programming Languages Learning and applying quantum programming languages such as Qiskit, Cirq, and Q# to develop quantum algorithms.

Key Topics: • Qiskit: IBM's open-source quantum computing framework.

• Cirq: Google's framework for developing quantum algorithms.

• Q#: Microsoft's quantum programming language.

• Algorithm Development: Writing and testing quantum algorithms.

23.7 Applications of Quantum Computing in Systems Engineering Investigation of potential applications of quantum computing in systems engineering, including optimization, simulation, and cryptography.

Key Topics: • Optimization: Using quantum computing to solve complex optimization problems.

• Simulation: Quantum simulations of physical systems.

• Cryptography: How quantum computing can enhance or break cryptographic systems.

23.8 Challenges and Future of Quantum Computing Discussion on the current challenges facing the field of quantum computing and potential directions for future research and development.

Key Topics: • Scalability: Challenges in scaling up quantum computers.

• Decoherence: Addressing the issue of qubit stability over time.

• Future Research: Directions for advancements in quantum computing technology.

23.9 Quantum Supremacy and its Implications Examination of the concept of quantum supremacy and its potential to revolutionize computing systems.

Key Topics: • Quantum Supremacy: Understanding what it means for a quantum computer to outperform classical computers.

• Implications: The potential impact on various industries and fields.

• Milestones: Significant achievements in reaching quantum supremacy.

These courses provide a comprehensive understanding of quantum computing in systems engineering, equipping students with the knowledge and skills to innovate and lead in this rapidly evolving field.

23.1 topics:

4.1 .12.15..23.2.Neurotechnology in Educational Technology This course explores the intersection of neurotechnology and educational technology, focusing on how advances in brain research and interface technologies can enhance learning experiences and outcomes. Students will delve into theoretical aspects, practical applications, as well as ethical implications of utilizing neurotechnology in education.

23.3.Introduction to Neurotechnology This topic provides a foundational understanding of neurotechnology, including its history, development, and current state of the art. Students will learn about various devices and technologies used in neurotechnology.

23.4.Neuroscience Basics for Educators An overview of essential neuroscience principles necessary for understanding how neurotechnology can be applied in educational contexts, focusing on brain structure and function in learning.

23.5.Brain-Computer Interfaces in Education Examine how Brain-Computer Interfaces (BCIs) can be used to facilitate learning, including current applications and future possibilities.

23.6.Cognitive Load Theory and Neurotechnology Understand how cognitive load theory informs the design of neurotechnology applications in learning environments.

23.7.Neuroscience-Based Adaptive Learning Technologies Explore how adaptive learning technologies informed by neuroscience can personalize and enhance educational experiences.

23.8.Ethical and Social Implications Consider the ethical and social implications of using neurotechnology in educational settings, including privacy concerns and consent.

23.9.Case Studies in Neurotechnology Education Review real-world case studies where neurotechnology has been applied within educational contexts and assess their outcomes.

23.10.Future Trends in Neurotechnology for Education Discuss and predict future trends in the deployment of neurotechnology for educational purposes, driven by technological and scientific advancements.

23.2 Neurotechnology in Educational Technology This course explores the intersection of neurotechnology and educational technology, focusing on how advances in brain research and interface technologies can enhance learning experiences and outcomes. Students will delve into theoretical aspects, practical applications, as well as ethical implications of utilizing neurotechnology in education.

23.3 Introduction to Neurotechnology This topic provides a foundational understanding of neurotechnology, including its history, development, and current state of the art. Students will learn about various devices and technologies used in neurotechnology.

Key Topics: • History and Development: Tracing the evolution of neurotechnology from its inception to current advancements.

• Devices and Technologies: Overview of brain-computer interfaces (BCIs), neuroimaging tools, and neurofeedback devices.

• Current State: Understanding the latest innovations and applications in neurotechnology.

23.4 Neuroscience Basics for Educators An overview of essential neuroscience principles necessary for understanding how neurotechnology can be applied in educational contexts, focusing on brain structure and function in learning.

Key Topics: • Brain Structure: Understanding the anatomy of the brain and its relevance to learning.

• Brain Function: Exploring how different brain regions contribute to cognitive processes.

• Neuroplasticity: The brain's ability to adapt and reorganize, crucial for learning and memory.

23.5 Brain-Computer Interfaces in Education Examine how Brain-Computer Interfaces (BCIs) can be used to facilitate learning, including current applications and future possibilities.

Key Topics: • BCI Technology: Understanding how BCIs work and their potential in education.

• Current Applications: Examples of BCIs being used to aid learning and accessibility.

• Future Possibilities: Exploring innovative ways BCIs could transform education.

23.6 Cognitive Load Theory and Neurotechnology Understand how cognitive load theory informs the design of neurotechnology applications in learning environments.

Key Topics: • Cognitive Load Theory: Basics of cognitive load and its impact on learning.

• Application Design: Designing neurotechnology tools that optimize cognitive load.

• Practical Examples: Implementing cognitive load principles in educational technology.

23.7 Neuroscience-Based Adaptive Learning Technologies Explore how adaptive learning technologies informed by neuroscience can personalize and enhance educational experiences.

Key Topics: • Adaptive Learning: Principles and benefits of adaptive learning systems.

• Neuroscience Insights: How neuroscience informs the design of adaptive learning technologies.

• Personalization: Creating personalized learning experiences based on cognitive and neurological data.

23.8 Ethical and Social Implications Consider the ethical and social implications of using neurotechnology in educational settings, including privacy concerns and consent.

Key Topics: • Ethical Considerations: Addressing issues such as data privacy, informed consent, and potential biases.

• Social Implications: Understanding the broader impact of neurotechnology on society and education.

• Regulatory Frameworks: Overview of regulations governing the use of neurotechnology in education.

23.9 Case Studies in Neurotechnology Education Review real-world case studies where neurotechnology has been applied within educational contexts and assess their outcomes.

Key Topics: • Case Studies: Detailed examination of successful neurotechnology implementations in education.

• Outcomes Assessment: Evaluating the effectiveness and impact of neurotechnology on learning outcomes.

• Lessons Learned: Key takeaways and best practices from real-world examples.

23.10 Future Trends in Neurotechnology for Education Discuss and predict future trends in the deployment of neurotechnology for educational purposes, driven by technological and scientific advancements.

Key Topics: • Emerging Trends: Identifying new and upcoming trends in neurotechnology and education.

• Future Directions: Exploring potential future developments and innovations.

• Research and Innovation: Current and future research initiatives in the field of neurotechnology for education.

These courses provide a comprehensive understanding of neurotechnology applications in educational technology, equipping students with the knowledge and skills to innovate and lead in this rapidly evolving field.

24. topics

4.1 .12.15.24.1.Robotic Process Automation in Electrochemical Engineering This course explores the integration of Robotic Process Automation (RPA) within the field of Electrochemical Engineering. The course provides a comprehensive understanding of how automation technologies can enhance efficiency, accuracy, and productivity in electrochemical processes, ranging from battery manufacturing to fuel cell production. Students will gain skills in designing, implementing, and managing automated processes in electrochemical settings.

24.2Introduction to Robotic Process Automation This module introduces the fundamentals of RPA, covering its history, benefits, and applications across various industries.

24.3.Fundamentals of Electrochemical Engineering Explore the core principles of electrochemical engineering, including electrochemistry, materials science, and process design.

24.4.RPA Tools and Platforms Gain insights into popular RPA tools and platforms like UiPath, Automation Anywhere, and Blue Prism. Understand their capabilities and use cases.

24.5.Automating Electrochemical Process Controls Study the application of RPA in automating the control systems within electrochemical processes, improving precision and efficiency.

24.6.Data Collection and Analysis in Electrochemical Systems Learn how RPA can facilitate data collection, analysis, and reporting in electrochemical systems, enhancing decision-making capabilities.

24.7.Machine Learning and RPA in Electrochemical Engineering Explore the intersection of machine learning and RPA in electrochemical engineering for predictive maintenance and process optimization.

24.8.RPA Implementation Challenges and Solutions Discuss the challenges faced during the implementation of RPA in electrochemical engineering and explore potential solutions.

24.9.Case Studies and Industry Applications Analyze various case studies to understand how RPA has been applied successfully in the field of electrochemical engineering across different sectors.

4.1 Robotic Process Automation in Electrochemical Engineering This course explores the integration of Robotic Process Automation (RPA) within the field of Electrochemical Engineering. The course provides a comprehensive understanding of how automation technologies can enhance efficiency, accuracy, and productivity in electrochemical processes, ranging from battery manufacturing to fuel cell production. Students will gain skills in designing, implementing, and managing automated processes in electrochemical settings.

24.2 Introduction to Robotic Process Automation This module introduces the fundamentals of RPA, covering its history, benefits, and applications across various industries.

Key Topics: • History of RPA: Understanding the origins and evolution of robotic process automation.

• Benefits: Exploring the advantages of RPA, such as increased efficiency, reduced errors, and cost savings.

• Applications: Examining how RPA is used in various industries, including finance, healthcare, and manufacturing.

24.3 Fundamentals of Electrochemical Engineering Explore the core principles of electrochemical engineering, including electrochemistry, materials science, and process design.

Key Topics: • Electrochemistry Basics: Understanding the chemical processes involved in electrochemical reactions.

• Materials Science: Studying the properties and behaviors of materials used in electrochemical systems.

• Process Design: Designing efficient and effective electrochemical processes.

24.4 RPA Tools and Platforms Gain insights into popular RPA tools and platforms like UiPath, Automation Anywhere, and Blue Prism. Understand their capabilities and use cases.

Key Topics: • UiPath: Overview of UiPath's features and applications.

• Automation Anywhere: Exploring Automation Anywhere's capabilities and use cases.

• Blue Prism: Understanding Blue Prism's tools and how they are used in RPA.

24.5 Automating Electrochemical Process Controls Study the application of RPA in automating the control systems within electrochemical processes, improving precision and efficiency.

Key Topics: • Control Systems Automation: Techniques for automating control systems in electrochemical processes.

• Precision and Efficiency: Enhancing precision and efficiency through automation.

• Real-World Applications: Examples of automated control systems in electrochemical engineering.

24.6 Data Collection and Analysis in Electrochemical Systems Learn how RPA can facilitate data collection, analysis, and reporting in electrochemical systems, enhancing decision-making capabilities.

Key Topics: • Data Collection: Techniques for automating data collection in electrochemical systems.

• Data Analysis: Using RPA to analyze data and generate insights.

• Reporting: Automating the generation of reports to support decision-making.

24.7 Machine Learning and RPA in Electrochemical Engineering Explore the intersection of machine learning and RPA in electrochemical engineering for predictive maintenance and process optimization.

Key Topics: • Predictive Maintenance: Using machine learning and RPA for predictive maintenance of electrochemical systems.

• Process Optimization: Enhancing process efficiency and effectiveness through machine learning and RPA.

• Case Studies: Real-world examples of machine learning and RPA in electrochemical engineering.

24.8 RPA Implementation Challenges and Solutions Discuss the challenges faced during the implementation of RPA in electrochemical engineering and explore potential solutions.

Key Topics: • Implementation Challenges: Identifying common challenges in RPA implementation.

• Solutions: Exploring strategies to overcome implementation challenges.

• Best Practices: Establishing best practices for successful RPA implementation.

24.9 Case Studies and Industry Applications Analyze various case studies to understand how RPA has been applied successfully in the field of electrochemical engineering across different sectors.

Key Topics: • Case Studies: Detailed analysis of successful RPA implementations in electrochemical engineering.

• Industry Applications: Exploring how different sectors use RPA in electrochemical processes.

• Lessons Learned: Understanding the key takeaways from real-world applications.

These courses provide a comprehensive understanding of robotic process automation in electrochemical engineering, equipping students with the knowledge and skills to enhance efficiency, accuracy, and productivity in this field

25.1topics

4.1 .12.15.25.1.Integrating Educational Technology in Renewable Energy Studies This course is designed for master's students interested in combining the fields of renewable energy and educational technology. It explores the role of technology in educating and informing about renewable energy, examining innovative teaching tools and strategies. Students will learn how to develop technology-driven educational materials and experiences aimed at increasing awareness, understanding, and adoption of renewable energy concepts.

25.2.Introduction to Renewable Energy An overview of various renewable energy sources, including solar, wind, hydroelectric, and geothermal. Discussions will include the benefits and challenges of each type along with their current global usage.

25.3.Educational Technology Tools Examines the digital tools and platforms available for creating engaging learning

25.4.Designing Interactive Learning Modules This topic covers the methodologies and best practices for designing interactive and immersive learning modules using educational technology.

25.5.Gamification in Renewable Energy Education Explores the concept of gamification and how game-like elements can enhance learning in renewable energy courses.

25.6.Virtual Labs and Simulations Discusses the role of virtual labs and simulations in teaching complex renewable energy concepts.

25.7.Assessing Learner Outcomes in Technology-Driven Curriculum This topic focuses on developing assessment strategies for technology-enhanced renewable energy education.

25.8.Case Studies in Renewable Energy Education Analyzes real-world examples of successful renewable energy educational programs and the role of technology in their delivery.

25.9.Challenges in Integrating Technology and Renewable Energy Education Addresses common challenges faced when integrating technology into renewable energy education and potential solution

25.1 Integrating Educational Technology in Renewable Energy Studies This course is designed for master's students interested in combining the fields of renewable energy and educational technology. It explores the role of technology in educating and informing about renewable energy, examining innovative teaching tools and strategies. Students will learn how to develop technology-driven educational materials and experiences aimed at increasing awareness, understanding, and adoption of renewable energy concepts.

25.2 Introduction to Renewable Energy An overview of various renewable energy sources, including solar, wind, hydroelectric, and geothermal. Discussions will include the benefits and challenges of each type along with their current global usage.

Key Topics: • Solar Energy: Principles, benefits, challenges, and global usage.

• Wind Energy: How wind power works, its advantages, and current implementation.

• Hydroelectric Energy: Understanding the mechanics and impact of hydroelectric power.

• Geothermal Energy: Exploring how geothermal energy is harnessed and its benefits.

25.3 Educational Technology Tools Examines the digital tools and platforms available for creating engaging learning experiences.

Key Topics: • Digital Learning Platforms: Overview of tools like Moodle, Canvas, and Google Classroom.

• Interactive Tools: Utilizing tools like Kahoot, Quizlet, and interactive whiteboards.

• Content Creation: Software for creating educational content, such as Adobe Captivate and Articulate Storyline.

25.4 Designing Interactive Learning Modules This topic covers the methodologies and best practices for designing interactive and immersive learning modules using educational technology.

Key Topics: • Module Design: Principles of designing effective interactive learning modules.

• Immersive Learning: Techniques to create immersive learning experiences.

• Best Practices: Strategies to enhance engagement and retention through interactivity.

25.5 Gamification in Renewable Energy Education Explores the concept of gamification and how game-like elements can enhance learning in renewable energy courses.

Key Topics: • Gamification Principles: Understanding the basics of gamification and its educational benefits.

• Application in Education: Implementing game elements like points, badges, and leaderboards in renewable energy education.

• Impact on Learning: How gamification improves motivation and engagement.

25.6 Virtual Labs and Simulations Discusses the role of virtual labs and simulations in teaching complex renewable energy concepts.

Key Topics: • Virtual Labs: Benefits and examples of virtual labs in renewable energy education.

• Simulations: Using simulations to teach and experiment with renewable energy concepts.

• Implementation: Best practices for integrating virtual labs and simulations into the curriculum.

25.7 Assessing Learner Outcomes in Technology-Driven Curriculum This topic focuses on developing assessment strategies for technology-enhanced renewable energy education.

Key Topics: • Assessment Methods: Different methods for assessing learner outcomes in tech-driven education.

• Formative and Summative Assessment: Utilizing both to measure progress and final understanding.

• Data Analysis: Using data from assessments to improve teaching strategies and learning outcomes.

25.8 Case Studies in Renewable Energy Education Analyzes real-world examples of successful renewable energy educational programs and the role of technology in their delivery.

Key Topics: • Case Studies: Detailed analysis of successful implementations of educational technology in renewable energy programs.

• Technology's Role: Understanding how technology facilitated learning and engagement.

• Lessons Learned: Key takeaways and best practices from real-world examples.

25.9 Challenges in Integrating Technology and Renewable Energy Education Addresses common challenges faced when integrating technology into renewable energy education and potential solutions.

Key Topics: • Common Challenges: Identifying barriers such as funding, access to technology, and teacher training.

• Solutions: Strategies to overcome these challenges.

• Future Directions: Exploring future trends and innovations in the field.

These courses provide a comprehensive understanding of how educational technology can be integrated into renewable energy studies, equipping students with the knowledge and skills to innovate and lead in this interdisciplinary fi

26.1

4.1 .12.15.26.1Wholesale Trade Management in Industrial Engineering This course is designed for students pursuing a Master's degree in Industrial Engineering with a focus on wholesale trade. It will cover the essential aspects of wholesale trade management, including supply chain dynamics, inventory control, logistics, procurement, and market analysis. The course will blend technical engineering concepts with business strategies to enable students to effectively manage and innovate within the wholesale trade sector.

26.2.Introduction to Wholesale Trade Explore the fundamentals of wholesale trade, its role in the supply chain, and the economic impact on industrial markets.

26.3.Supply Chain Dynamics Understand the complexities of supply chain management, including network design, integration, and leveraging technology for efficiency.

26.4.Inventory Control Methods Study various inventory management techniques, such as Just-In-Time, Economic Order Quantity, and ABC analysis to optimize stock levels.

26.5.Logistics and Distribution Examine the logistics involved in wholesale trade, focusing on distribution networks, transportation management, and warehousing solutions.

26.6.Procurement Strategies Learn about procurement processes and strategies, vendor selection, and relationship management to secure effective supply sources.

26.7.Market Analysis and Forecasting Study techniques for market analysis, trend observation, and forecasting methods to drive strategic decisions in wholesale trade.

27.8.Risk Management in Wholesale Trade Analyze risk management principles, identifying potential risks in the wholesale supply chain and developing mitigation strategies.

27.9.Regulatory and Ethical Considerations Explore the regulatory landscape affecting wholesale trade and the ethical considerations of operating within the sector.

26.1 Wholesale Trade Management in Industrial Engineering This course is designed for students pursuing a Master's degree in Industrial Engineering with a focus on wholesale trade. It will cover the essential aspects of wholesale trade management, including supply chain dynamics, inventory control, logistics, procurement, and market analysis. The course will blend technical engineering concepts with business strategies to enable students to effectively manage and innovate within the wholesale trade sector.

26.2 Introduction to Wholesale Trade Explore the fundamentals of wholesale trade, its role in the supply chain, and the economic impact on industrial markets.

Key Topics: • Fundamentals: Understanding the basics of wholesale trade.

• Role in Supply Chain: How wholesale trade fits within the broader supply chain.

• Economic Impact: Examining the economic significance of wholesale trade on industrial markets.

26.3 Supply Chain Dynamics Understand the complexities of supply chain management, including network design, integration, and leveraging technology for efficiency.

Key Topics: • Network Design: Principles of designing efficient supply chain networks.

• Integration: Integrating various components of the supply chain for seamless operations.

• Technology: Utilizing technology to enhance supply chain efficiency.

26.4 Inventory Control Methods Study various inventory management techniques, such as Just-In-Time, Economic Order Quantity, and ABC analysis to optimize stock levels.

Key Topics: • Just-In-Time (JIT): Minimizing inventory holding costs by receiving goods only as needed.

• Economic Order Quantity (EOQ): Calculating the optimal order quantity to minimize total inventory costs.

• ABC Analysis: Categorizing inventory to prioritize management efforts.

26.5 Logistics and Distribution Examine the logistics involved in wholesale trade, focusing on distribution networks, transportation management, and warehousing solutions.

Key Topics: • Distribution Networks: Designing and managing distribution networks.

• Transportation Management: Efficiently managing transportation logistics.

• Warehousing Solutions: Implementing effective warehousing strategies.

26.6 Procurement Strategies Learn about procurement processes and strategies, vendor selection, and relationship management to secure effective supply sources.

Key Topics: • Procurement Processes: Understanding procurement procedures and best practices.

• Vendor Selection: Criteria for selecting and evaluating vendors.

• Relationship Management: Building and maintaining strong supplier relationships.

26.7 Market Analysis and Forecasting Study techniques for market analysis, trend observation, and forecasting

methods to drive strategic decisions in wholesale trade.

Key Topics: • Market Analysis: Techniques for analyzing market conditions and trends.

• Trend Observation: Identifying and interpreting market trends.

• Forecasting Methods: Using quantitative and qualitative methods to predict future market conditions.

26.8 Risk Management in Wholesale Trade Analyze risk management principles, identifying potential risks in the wholesale supply chain and developing mitigation strategies.

Key Topics: • Risk Identification: Identifying potential risks in the supply chain.

• Mitigation Strategies: Developing strategies to mitigate identified risks.

• Risk Management Frameworks: Implementing risk management frameworks to ensure supply chain resilience.

26.9 Regulatory and Ethical Considerations Understand the regulatory and ethical considerations in wholesale trade, including compliance with laws and promoting ethical business practices.

Key Topics: • Regulatory Compliance: Ensuring adherence to relevant laws and regulations.

• Ethical Business Practices: Promoting ethical behavior and corporate social responsibility.

• Case Studies: Analyzing real-world examples of regulatory and ethical challenges in wholesale trade.

These courses provide a comprehensive understanding of wholesale trade management in industrial engineering, equipping students with the knowledge and skills to effectively manage and innovate within the wholesale trade sector.

28.topics

4.1 .12.15..29. 1.Advanced Wireless Communications This course explores the fundamental principles and advanced techniques of wireless communications, designed for students in electronic engineering. It covers critical concepts, system designs, and the latest advancements in wireless technologies to prepare students for careers in the telecommunications industry.

29.2.Introduction to Wireless Communications Overview of wireless communication systems, historical developments, and contemporary applications.

29.3.Radio Frequency Fundamentals Exploration of radio frequency (RF) spectrum, key RF principles, and their application in wireless communication.

29.4.Wireless Signal Propagation Understanding the behavior of wireless signals over various media and environments, including path loss, fading, and interference.

29.5.Multiple Access Techniques Survey of multiple access schemes including FDMA, TDMA, CDMA, and OFDMA, which enable multiple users to share the same frequency band.

29.6.Wireless Networking and Protocols Introduction to wireless network design, including protocol layers, network architectures, and routing protocols.

29.7.Cellular Systems and 5G In-depth analysis of cellular network architecture, with a focus on the evolution from 1G to 5G, and future trends.

29.8..Antenna Theory and Design Study of antenna characteristics, types, and their utilization in wireless communication systems.

29.8Wireless Security Exploration of security challenges and solutions in wireless communications, including encryption and authentication methodologies.

29.6IoT and Wireless Sensor Networks Examination of Internet of Things (IoT) concepts, architectures, and the role of wireless sensor networks in IoT implementations.

29.1 Advanced Wireless Communications This course explores the fundamental principles and advanced techniques of wireless communications, designed for students in electronic engineering. It covers critical concepts, system designs, and the latest advancements in wireless technologies to prepare students for careers in the telecommunications industry.

29.2 Introduction to Wireless Communications Overview of wireless communication systems, historical developments, and contemporary applications.

Key Topics: • Wireless Communication Systems: Basic principles and components of wireless communication systems.

• Historical Developments: Key milestones in the evolution of wireless communications.

• Contemporary Applications: Current uses of wireless technology in various fields.

29.3 Radio Frequency Fundamentals Exploration of radio frequency (RF) spectrum, key RF principles, and their application in wireless communication.

Key Topics: • RF Spectrum: Understanding the RF spectrum and its allocation.

• RF Principles: Basics of RF communication, including modulation and demodulation.

• Applications: Practical uses of RF technology in wireless communication.

29.4 Wireless Signal Propagation Understanding the behavior of wireless signals over various media and environments, including path loss, fading, and interference.

Key Topics: • Signal Propagation: How wireless signals travel through different media.

• Path Loss: Factors affecting the attenuation of signal strength.

• Fading and Interference: Understanding and mitigating fading and interference effects.

29.5 Multiple Access Techniques Survey of multiple access schemes including FDMA, TDMA, CDMA, and OFDMA, which enable multiple users to share the same frequency band.

Key Topics: • FDMA (Frequency Division Multiple Access): Assigning different frequency bands to multiple users.

• TDMA (Time Division Multiple Access): Allocating time slots to multiple users on the same frequency.

• CDMA (Code Division Multiple Access): Using unique codes to differentiate users sharing the same frequency.

• OFDMA (Orthogonal Frequency Division Multiple Access): Combining multiple sub-carriers to improve efficiency and performance.

29.6 Wireless Networking and Protocols Introduction to wireless network design, including protocol layers, network architectures, and routing protocols.

Key Topics: • Protocol Layers: Understanding the different layers in wireless communication protocols.

• Network Architectures: Designing and implementing wireless network architectures.

• Routing Protocols: Overview of routing protocols used in wireless networks.

29.7 Cellular Systems and 5G In-depth analysis of cellular network architecture, with a focus on the evolution

from 1G to 5G, and future trends.

Key Topics: • Cellular Network Architecture: Structure and components of cellular networks.

• 1G to 5G Evolution: Historical progression and key features of each generation.

• Future Trends: Emerging technologies and advancements in cellular communications.

29.8 Antenna Theory and Design Study of antenna characteristics, types, and their utilization in wireless communication systems.

Key Topics: • Antenna Characteristics: Key parameters and performance metrics of antennas.

• Types of Antennas: Different types of antennas used in wireless communication.

• Design and Utilization: Designing and deploying antennas for optimal performance.

29.9 Wireless Security Exploration of security challenges and solutions in wireless communications, including encryption and authentication methodologies.

Key Topics: • Security Challenges: Identifying common security threats in wireless communication.

• Encryption: Techniques for securing wireless communication through encryption.

• Authentication: Methods for verifying the identity of users and devices.

29.10 IoT and Wireless Sensor Networks Examination of Internet of Things (IoT) concepts, architectures, and the role of wireless sensor networks in IoT implementations.

Key Topics: • IoT Concepts: Understanding the basic principles and applications of IoT.

• Architectures: Designing IoT systems and integrating wireless sensor networks.

• Wireless Sensor Networks: Deploying and managing sensor networks for IoT applications.

These courses provide a comprehensive understanding of advanced wireless communications, equipping students with the knowledge and skills to excel in the telecommunications industry.

30 topics

4.1 .12.15.30.1.Advanced Electrical Engineering in Construction and Civil Engineering This course provides an in-depth understanding of electrical engineering principles and their applications in construction and civil engineering. Students will learn about the integration of electrical systems within construction projects, the challenges of implementing sustainable energy solutions, and the latest technologies in the field. Emphasis is placed on practical analysis, design, and problem-solving skills necessary for modern construction projects.

30.2. Fundamentals of Electrical Systems in Construction Overview of electrical systems essential in construction projects, including power distribution, lighting, and wiring systems.

30.3.Electrical Safety Standards and Codes Detailed study of electrical safety standards, codes, and regulations specific to construction sites.

30.4.Integration of Electrical Systems in Building Design Techniques for integrating electrical systems with architectural and structural frameworks in buildings.

30.5Sustainable and Renewable Energy Technologies Exploration of sustainable and renewable energy technologies applicable to construction projects.

30.6.Smart Grids and Intelligent Networks Study of smart grid technologies and their application in modern urban infrastructure.

30.7 Electrical System Design and Simulation Practical approaches to the design and simulation of electrical

30.7.Electrical System Design and Simulation Practical approaches to the design and simulation of electrical systems for construction projects using industry-standard software.

30.8.Power Quality and Energy Management Analysis of power quality issues and energy management strategies for improved efficiency.

30.9.Electrical Systems in Infrastructure Projects Examination of the role of electrical engineering in large-scale infrastructure projects, such as transportation and water systems

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30.2 Fundamentals of Electrical Systems in Construction Overview of electrical systems essential in construction projects, including power distribution, lighting, and wiring systems.

Key Topics: • Power Distribution: Understanding the design and implementation of power distribution systems.

• Lighting Systems: Techniques for efficient lighting design in construction projects.

• Wiring Systems: Best practices for wiring systems, including safety and compliance.

30.3 Electrical Safety Standards and Codes Detailed study of electrical safety standards, codes, and regulations specific to construction sites.

Key Topics: • Safety Standards: Overview of key electrical safety standards.

• Codes and Regulations: Understanding and complying with electrical codes and regulations.

• Site Safety: Implementing safety practices on construction sites to prevent electrical hazards.

30.4 Integration of Electrical Systems in Building Design Techniques for integrating electrical systems with architectural and structural frameworks in buildings.

Key Topics: • System Integration: Strategies for seamlessly integrating electrical systems within building designs.

• Coordination with Other Trades: Ensuring coordination between electrical systems and other construction trades.

• Design Optimization: Techniques for optimizing electrical designs for efficiency and performance.

30.5 Sustainable and Renewable Energy Technologies Exploration of sustainable and renewable energy technologies applicable to construction projects.

Key Topics: • Solar Energy: Implementation of solar panels and photovoltaic systems in construction.

• Wind Energy: Integrating wind turbines and other wind energy systems.

• Energy Storage: Utilizing energy storage solutions such as batteries and thermal storage.

30.6 Smart Grids and Intelligent Networks Study of smart grid technologies and their application in modern urban infrastructure.

Key Topics: • Smart Grid Technologies: Understanding the components and benefits of smart grids.

• Intelligent Networks: Designing and managing intelligent networks for energy distribution.

• Urban Infrastructure: Applying smart grid technologies to modern urban infrastructure projects

Urban Infrastructure: Applying smart grid technologies to modern urban infrastructure projects.

30.7 Electrical System Design and Simulation Practical approaches to the design and simulation of electrical systems for construction projects using industry-standard software.

Key Topics: • Design Software: Tools and software for electrical system design and simulation.

• Simulation Techniques: Methods for simulating electrical systems to predict performance.

• Project Examples: Case studies of electrical system design and simulation in real-world projects.

30.8 Power Quality and Energy Management Analysis of power quality issues and energy management strategies for improved efficiency.

Key Topics: • Power Quality: Identifying and addressing power quality issues such as voltage sags, harmonics, and transients.

• Energy Management: Strategies for efficient energy management in construction projects.

• Efficiency Improvement: Techniques for improving the overall efficiency of electrical systems.

30.9 Electrical Systems in Infrastructure Projects Examination of the role of electrical engineering in large-scale infrastructure projects, such as transportation and water systems.

Key Topics: • Transportation Systems: Electrical engineering applications in transportation infrastructure.

• Water Systems: Designing and managing electrical systems in water treatment and distribution.

• Infrastructure Projects: Examples of large-scale infrastructure projects and their electrical requirements.

These courses provide a comprehensive understanding of advanced electrical engineering principles and their application in construction and civil engineering, equipping students with the knowledge and skills to effectivel

4.1 .12.15.Electrical Systems in Construction and Civil Engineering This master's level course is designed to bridge the fields of construction and civil engineering with electrical engineering principles. Students will learn to integrate electrical systems into construction projects effectively, ensuring safety, efficiency, and innovation in modern infrastructure.

Introduction to Electrical Systems in Construction Overview of electrical systems integration in construction projects, considering design, installation, and maintenance.

Power Distribution in Buildings Explore the principles and challenges of power distribution systems in modern buildings, including load assessments and distribution panels.

Lighting Systems and Design Study the design and implementation of efficient lighting systems in commercial and residential buildings.

Electrical Safety Standards and Regulations Learn about international and local electrical safety standards and regulations pertinent to construction projects.

Sustainability in Electrical Engineering Understand sustainable practices and technologies, such as solar power and energy efficiency in construction.

Smart Buildings and IoT Integration Examine the incorporation of smart technologies and IoT in building systems for improved energy management and automation.

Electrical Load Analysis and Estimation Learn methods to analyze electrical loads and estimate demand for optimal system design.

Integration of Renewable Energy Sources Explore the potential of integrating renewable energy sources into

construction projects and urban environments.

Project Management in Electrical Engineering Develop skills in managing electrical engineering projects within the construction industry, focusing on timelines, budgets, and resource allocation.

30.1topics

4.1 .12.15.30.1.Doctorate in Specialist Engineering Infrastructure and Contractors: Electrical Engineering This advanced course is designed for students pursuing a Doctorate degree in Specialist Engineering Infrastructure and Contractors with a focus on Electrical Engineering. The course aims to equip students with in-depth knowledge and practical skills necessary for the design, implementation, and management of electrical infrastructure projects. Students will explore contemporary challenges, innovative solutions, and emerging technologies in electrical engineering.

30.2.Advanced Power System Analysis Exploration of power flow analysis, fault analysis, and stability assessment in large-scale electrical power systems with a focus on real-world applications.

30.3Renewable Energy Systems An in-depth examination of renewable energy technology integration, focusing on wind, solar, and hydroelectric power systems.

30.4.Electrical Infrastructure Design and Management Comprehensive overview of electrical infrastructure planning, design methodologies, and management practices for efficient operation.

31.5.Smart Grids and IoT Applications Study of smart grid technology, IoT applications in electrical systems, and their impact on efficiency and sustainability.

31.6..High Voltage Engineering Analysis of high voltage engineering principles, equipment, and testing methodologies in power transmission.

31.7.Project Management in Electrical Engineering Principles and practices of effective project management tailored to electrical engineering projects and infrastructure.

31.8Energy Policy and Ethical Considerations Examination of energy policies, regulatory frameworks, and ethical considerations impacting electrical infrastructure projects.

31.1Sustainable Electrical Engineering Practices Strategies for incorporating sustainable practices in the planning, design, and execution of electrical engineering projects

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30.2 Advanced Power System Analysis Exploration of power flow analysis, fault analysis, and stability assessment in large-scale electrical power systems with a focus on real-world applications.

Key Topics: • Power Flow Analysis: Techniques for analyzing the flow of electrical power in networks.

• Fault Analysis: Identifying and mitigating faults in power systems.

• Stability Assessment: Evaluating and ensuring the stability of power systems.

30.3 Renewable Energy Systems An in-depth examination of renewable energy technology integration, focusing on wind, solar, and hydroelectric power systems.

Key Topics: • Wind Energy: Understanding the technology and integration of wind power systems.

• Solar Energy: Exploring photovoltaic systems and their applications.

• Hydroelectric Power: Implementing hydroelectric systems in renewable energy projects.

30.4 Electrical Infrastructure Design and Management Comprehensive overview of electrical infrastructure planning, design methodologies, and management practices for efficient operation.

Key Topics: • Infrastructure Planning: Strategies for effective electrical infrastructure planning.

• Design Methodologies: Best practices in designing electrical infrastructure.

• Management Practices: Techniques for managing and maintaining electrical systems.

31.5 Smart Grids and IoT Applications Study of smart grid technology, IoT applications in electrical systems, and their impact on efficiency and sustainability.

Key Topics: • Smart Grid Technology: Understanding the components and benefits of smart grids.

• IoT in Electrical Systems: Integrating IoT devices to enhance electrical system performance.

• Efficiency and Sustainability: Improving efficiency and sustainability through smart grid and IoT applications.

31.6 High Voltage Engineering Analysis of high voltage engineering principles, equipment, and testing methodologies in power transmission.

Key Topics: • High Voltage Principles: Core principles of high voltage engineering.

• Equipment: Understanding high voltage equipment and its applications.

• Testing Methodologies: Techniques for testing and ensuring the reliability of high voltage systems.

31.7 Project Management in Electrical Engineering Principles and practices of effective project management tailored to electrical engineering projects and infrastructure.

Key Topics: • Project Planning: Techniques for planning electrical engineering projects.

• Resource Management: Managing resources effectively in electrical projects.

• Risk Management: Identifying and mitigating risks in project management.

31.8 Energy Policy and Ethical Considerations Examination of energy policies, regulatory frameworks, and ethical considerations impacting electrical infrastructure projects.

Key Topics: • Energy Policies: Understanding policies that influence electrical engineering.

• Regulatory Frameworks: Complying with regulations in electrical infrastructure projects.

• Ethical Considerations: Addressing ethical issues in electrical engineering.

31.9 Sustainable Electrical Engineering Practices Strategies for incorporating sustainable practices in the planning, design, and execution of electrical engineering projects.

Key Topics: • Sustainable Design: Principles of designing sustainable electrical systems.

• Energy Efficiency: Implementing energy-efficient practices in electrical engineering.

• Environmental Impact: Reducing the environmental impact of electrical projects.

These courses provide a comprehensive understanding of specialist engineering infrastructure and contractors with a focus on electrical engineering, equipping students with the knowledge and skills to effectively manage and innovate within the field

Admission Ready - Completing your application - Atlantic International University 32.Topic 4.1

.12.15..32.1Clean Energy Technology: Ecotechnology Applications This course provides an in-depth understanding of clean energy technologies with a focus on ecotechnology. It explores various aspects of renewable energy, sustainable practices, and innovations that contribute to reducing environmental impacts and fostering ecological balance. Students will gain expertise in evaluating and implementing clean energy systems within a framework of ecological sustainability and environmental responsibility.

32.3.Introduction to Clean Energy and Ecotechnology An overview of clean energy principles, the importance of ecotechnology, and how these fields integrate to promote sustainable development.

32.4.Solar Energy Technologies Exploration of solar energy systems, including photovoltaic and solar thermal technologies, and their applications in sustainable energy solutions.

32.5.Wind Energy Systems Study of wind energy generation, the mechanics of wind turbines, and the potential of wind power as a clean energy source.

32.6.Bioenergy and Biomass Understanding the role of biomass in clean energy systems, including conversion technologies and sustainable biomass sourcing.

32.7.Hydropower and Ocean Energy Exploration of hydropower technologies and emerging ocean energy systems such as tidal and wave energy, focusing on their ecological impact and potential.

32.8.Geothermal Energy An examination of geothermal energy technologies, their environmental implications, and their role in global clean energy strategies.

32.9.Energy Storage and Smart Grids Understanding the role of energy storage technologies and smart grid systems in enhancing the efficiency and reliability of clean energy distribution.

32.10.Policy and Economics of Clean Energy Analysis of the policies and economic factors that influence clean energy adoption, with a focus on incentivizing ecotechnological innovations.

32.11Ecological Impact of Renewable Energy Evaluating the ecological impacts of renewable energy projects and the methods to mitigate negative effects on the environment.

32.12.Future Directions in Clean Energy and Ecotechnology Exploration of upcoming trends and innovations in clean energy and ecotechnology, including research and development prospects.

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32.3 Introduction to Clean Energy and Ecotechnology An overview of clean energy principles, the importance of ecotechnology, and how these fields integrate to promote sustainable development.

Key Topics: • Clean Energy Principles: Understanding the basic concepts of clean energy.

• Importance of Ecotechnology: The role of ecotechnology in achieving sustainable development.

• Integration: How clean energy and ecotechnology work together to promote environmental sustainability.

32.4 Solar Energy Technologies Exploration of solar energy systems, including photovoltaic and solar thermal technologies, and their applications in sustainable energy solutions.

Key Topics: • Photovoltaic Systems: Basics and applications of photovoltaic solar panels.

• Solar Thermal Technologies: Understanding solar thermal energy and its uses.

• Sustainable Solutions: Implementing solar technologies in sustainable energy projects.

• Sustainable Solutions: Implementing solar technologies in sustainable energy projects.

32.5 Wind Energy Systems Study of wind energy generation, the mechanics of wind turbines, and the potential of wind power as a clean energy source.

Key Topics: • Wind Energy Generation: Principles of generating energy from wind.

• Wind Turbines: Mechanics and design of wind turbines.

• Potential and Applications: Evaluating the potential of wind power as a renewable energy source.

32.6 Bioenergy and Biomass Understanding the role of biomass in clean energy systems, including conversion technologies and sustainable biomass sourcing.

Key Topics: • Biomass: Types of biomass used in energy production.

• Conversion Technologies: Methods of converting biomass into usable energy.

• Sustainable Sourcing: Ensuring sustainable practices in sourcing biomass.

32.7 Hydropower and Ocean Energy Exploration of hydropower technologies and emerging ocean energy systems such as tidal and wave energy, focusing on their ecological impact and potential.

Key Topics: • Hydropower Technologies: Basics of hydropower generation.

• Ocean Energy Systems: Understanding tidal and wave energy technologies.

• Ecological Impact: Assessing the ecological effects of hydropower and ocean energy projects.

32.8 Geothermal Energy An examination of geothermal energy technologies, their environmental implications, and their role in global clean energy strategies.

Key Topics: • Geothermal Technologies: Basics of geothermal energy production.

• Environmental Implications: Understanding the impact of geothermal energy on the environment.

• Global Strategies: Role of geothermal energy in worldwide clean energy initiatives.

32.9 Energy Storage and Smart Grids Understanding the role of energy storage technologies and smart grid systems in enhancing the efficiency and reliability of clean energy distribution.

Key Topics: • Energy Storage Technologies: Exploring different types of energy storage solutions.

• Smart Grids: Basics of smart grid technology and its benefits.

• Efficiency and Reliability: Improving energy distribution through advanced storage and smart grid systems.

32.10 Policy and Economics of Clean Energy Analysis of the policies and economic factors that influence clean energy adoption, with a focus on incentivizing ecotechnological innovations.

Key Topics: • Clean Energy Policies: Understanding the policy landscape for clean energy.

• Economic Factors: Evaluating the economic benefits and challenges of clean energy adoption.

• Incentives: Exploring incentives and support mechanisms for ecotechnology innovations.

32.11 Ecological Impact of Renewable Energy Evaluating the ecological impacts of renewable energy projects and the methods to mitigate negative effects on the environment.

Key Topics: • Impact Assessment: Techniques for assessing the ecological impact of renewable energy projects.

• Mitigation Strategies: Methods to reduce the environmental impact of clean energy systems.

• Best Practices: Implementing best practices for ecological sustainability in renewable energy.

32.12 Future Directions in Clean Energy and Ecotechnology Exploration of upcoming trends and innovations in clean energy and ecotechnology, including research and development prospects.

Key Topics: • Emerging Trends: Identifying new trends and innovations in clean energy and ecotechnology.

• Research and Development: Current and future research initiatives in the field.

• Future Prospects: Predicting future directions and advancements in clean energy and ecotechnology.

These courses provide a comprehensive understanding of clean energy technology and ecotechnology applications, equipping students with the knowledge and skills to innovate and lead in this field.

33.Topics 4.1 .12.15.33.1Integration of Electronic Engineering in Construction and Civil Engineering This course aims to explore the integration of electronic engineering principles within the domains of construction and civil engineering. The course will cover the utilization of electronic systems for improved construction processes, smart infrastructure, and sustainable development. Students will gain interdisciplinary knowledge and practical skills to innovate and optimize civil engineering projects using electronic solutions.

33.2.Introduction to Electronic Systems in Civil Engineering This topic provides an overview of the role and importance of electronic systems in the construction and civil engineering industries.

33.3.Smart Construction Technologies Exploring various smart construction technologies enabled by electronic systems such as sensors, IoT devices, and automation.

33.4.IoT in Infrastructure Management Understanding how IoT devices are used in managing and monitoring infrastructure and civil engineering projects.

33.5.Electronic Monitoring and Control Systems This topic covers the usage of electronic systems for monitoring and control within large-scale construction projects.

33.6.Automation in Construction Machinery Explore how electronic engineering drives the automation of construction machinery for enhanced efficiency and precision.

33.7.Solar and Renewable Energy Systems in Civil Engineering Investigate how electronic engineering aids in integrating solar and renewable energy systems into modern civil engineering projects.

33.8.Building Information Modeling (BIM) and Electronic Systems Understand the role of electronic systems in enhancing Building Information Modeling processes.

33.9.Cybersecurity in Smart Infrastructure Learn about the importance of cybersecurity systems to protect smart civil infrastructure from digital threats.

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33.1 Integration of Electronic Engineering in Construction and Civil Engineering This course aims to explore the integration of electronic engineering principles within the domains of construction and civil engineering. The course will cover the utilization of electronic systems for improved construction processes, smart infrastructure, and sustainable development. Students will gain interdisciplinary knowledge and practical skills to innovate and optimize civil engineering projects using electronic solutions.

33.2 Introduction to Electronic Systems in Civil Engineering This topic provides an overview of the role and importance of electronic systems in the construction and civil engineering industries.

Key Topics: • Role and Importance: Understanding how electronic systems are essential in modern construction and civil engineering.

• Applications: Examples of electronic systems used in these industries.

• Technological Integration: How electronic engineering is integrated into construction projects.

33.3 Smart Construction Technologies Exploring various smart construction technologies enabled by electronic systems such as sensors, IoT devices, and automation.

Key Topics: • Sensors: Use of sensors for real-time monitoring and data collection.

• IoT Devices: Implementing IoT devices to create connected construction sites.

• Automation: Enhancing construction processes through automation technologies.

33.4 IoT in Infrastructure Management Understanding how IoT devices are used in managing and monitoring infrastructure and civil engineering projects.

Key Topics: • IoT Devices: Types and functions of IoT devices in infrastructure management.

• Monitoring: Techniques for using IoT to monitor infrastructure health and performance.

• Management: Strategies for managing infrastructure projects using IoT technologies.

33.5 Electronic Monitoring and Control Systems This topic covers the usage of electronic systems for monitoring and control within large-scale construction projects.

Key Topics: • Monitoring Systems: Implementing electronic systems to monitor construction activities.

• Control Systems: Using electronic control systems to manage construction processes.

• Large-Scale Projects: Examples of electronic monitoring and control in large construction projects.

33.6 Automation in Construction Machinery Explore how electronic engineering drives the automation of construction machinery for enhanced efficiency and precision.

Key Topics: • Construction Machinery: Types of machinery that can be automated.

• Efficiency and Precision: Benefits of automation in construction machinery.

• Technology Integration: How electronic engineering enables automation in construction equipment.

33.7 Solar and Renewable Energy Systems in Civil Engineering Investigate how electronic engineering aids in integrating solar and renewable energy systems into modern civil engineering projects.

Key Topics: • Solar Energy Systems: Design and integration of solar energy solutions.

• Renewable Energy: Incorporating various renewable energy sources in civil engineering.

• Sustainability: Promoting sustainable development through renewable energy systems.

33.8 Building Information Modeling (BIM) and Electronic Systems Understand the role of electronic systems in enhancing Building Information Modeling processes.

Key Topics: • BIM Technology: Basics and benefits of Building Information Modeling.

• Electronic Integration: How electronic systems improve BIM processes.

• Efficiency and Collaboration: Enhancing project efficiency and collaboration through BIM.

33.9 Cybersecurity in Smart Infrastructure Learn about the importance of cybersecurity systems in protecting smart infrastructure from cyber threats.

Key Topics: • Cybersecurity Principles: Understanding the basics of cybersecurity.

• Smart Infrastructure: Identifying vulnerabilities in smart infrastructure systems.

• Protection Strategies: Implementing cybersecurity measures to protect smart infrastructure.

These courses provide a comprehensive understanding of how electronic engineering can be integrated into construction and civil engineering, equipping students with the knowledge and skills to innovate and optimize projects using electronic solution

34.1.Topic 4.1 .12.15..34.2.Masters in Immutable Data Storage Solutions for Web Design This course provides an advanced understanding of immutable data storage solutions specifically tailored for web design. Students will explore the principles of immutable data, analyze different storage solutions, and apply best practices in the context of developing modern, resilient web applications.

34.3.Introduction to Immutable Data An overview of immutable data, its importance in web design, and basic concepts such as data structures and potential benefits.

33.4.Immutable Data Structures Discussion on various immutable data structures such as lists, sets, and maps. Understanding their use and advantages in web development.

33.5.Immutable.js and Alternatives An examination of popular libraries like Immutable.js and other alternatives that offer immutable data structures in JavaScript.

33.6.State Management with Immutable Data Exploring how immutable data can simplify state management in web applications, with a focus on integrating with popular frameworks.

33.7.Performance Benefits of Immutable Data Investigating the performance benefits that immutable data can bring to web applications and how these benefits can be maximized.

33.8.GraphQL and Immutable Data Integrating immutable data with GraphQL endpoints and understanding the implications for web application design.

33.9.Immutable Data in Server-Side Rendering (SSR) Utilizing immutable data in server-side rendering processes to boost performance and maintain data consistency.

33.10.Security and Immutable Data Understanding security concerns and best practices when implementing immutable data storage solutions in web applications.

33.11.Future Trends in Immutable Data Exploring future trends and developments in immutable data storage solutions and how they might impact web design.

Masters in Immutable Data Storage Solutions for Web Design This course provides an advanced understanding of immutable data storage solutions specifically tailored for web design. Students will explore the principles of immutable data, analyze different storage solutions, and apply best practices in the context of developing modern, resilient web applications.

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Key Topics: • Basics of Immutable Data: Understanding what immutable data is and why it's important.

• Data Structures: Exploring the types of data structures used in immutable data.

• Benefits: Identifying the potential benefits of using immutable data in web design.

34.3 Immutable Data Structures Discussion on various immutable data structures such as lists, sets, and maps. Understanding their use and advantages in web development.

Key Topics: • Lists: Using immutable lists and their advantages.

• Sets: Implementing immutable sets for unique data storage.

• Maps: Exploring the use of immutable maps and their benefits.

34.4

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• Sets: Implementing immutable sets for unique data storage.

• Maps: Exploring the use of immutable maps and their benefits.

34.4

35.1.Topic 4.1 .12.15..35.2.Advanced Cyber-Physical Systems in Telecommunications This course explores the intersection of cyber-physical systems and telecommunications, providing an in-depth understanding of how these technologies integrate to create innovative solutions. The course covers the architecture, design, and implementation of next-generation telecommunication systems using cyber-physical components, with a keen focus on real-world applications and research developments.

35.3.Introduction to Cyber-Physical Systems Understand the core concepts and significance of cyber-physical systems (CPS) in the modern world, particularly in the telecommunications industry.

35.4.Network Architecture in CPS Study the architectural principles of integrating CPS with telecommunication networks, including topologies, network protocols, and infrastructure.

35.5..IoT and Cyber-Physical Systems Explore the role of the Internet of Things (IoT) as a component of CPS, focusing on its application in telecommunications.

35.6.Security and Privacy in CPS Examine security challenges and privacy concerns in CPS, particularly how these affect telecommunication systems.

35.7.Real-time Data Processing and Analytics Learn about the techniques and technologies used for real-time data processing and analytics in the context of CPS and telecommunications.

35.8.Machine Learning in Cyber-Physical Systems Understand how machine learning can be applied to optimize and innovate CPS within tele----------communications.

35.9.Emerging Trends in CPS and Telecommunications Discover the latest research and technological trends shaping the future of CPS in the telecom sector.

35.10.CPS Case Studies in Telecommunications Analyze real-world case studies where CPS has been effectively integrated into telecommunications systems.

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35.3 Introduction to Cyber-Physical Systems Understand the core concepts and significance of cyber-physical systems (CPS) in the modern world, particularly in the telecommunications industry.

Key Topics: • Core Concepts: Basics of CPS and their importance in modern technology.

• Significance: Understanding why CPS are crucial in telecommunications.

• Applications: Various applications of CPS in different sectors.

35.4 Network Architecture in CPS Study the architectural principles of integrating CPS with telecommunication networks, including topologies, network protocols, and infrastructure.

Key Topics: • Architectural Principles: Fundamentals of network architecture in CPS.

• Topologies: Different types of network topologies used in CPS.

• Network Protocols: Understanding network protocols for CPS integration.

• Infrastructure: Building and managing CPS infrastructure in telecommunications.

35.5 IoT and Cyber-Physical Systems Explore the role of the Internet of Things (IoT) as a component of CPS, focusing on its application in telecommunications.

Key Topics: • IoT Basics: Understanding the fundamentals of IoT.

• IoT in CPS: How IoT devices integrate with CPS.

• Applications in Telecommunications: Using IoT for enhancing telecommunications systems.

35.6 Security and Privacy in CPS Examine security challenges and privacy concerns in CPS, particularly how these affect telecommunication systems.

Key Topics: • Security Challenges: Identifying and addressing security issues in CPS.

• Privacy Concerns: Ensuring data privacy in CPS applications.

• Impact on Telecommunications: Understanding how security and privacy issues affect telecom systems.

35.7 Real-time Data Processing and Analytics Learn about the techniques and technologies used for real-time data processing and analytics in the context of CPS and telecommunications.

Key Topics: • Real-time Processing: Techniques for real-time data processing in CPS.

• Analytics: Using analytics to gain insights from CPS data.

• Technologies: Tools and technologies for real-time data processing and analytics.

35.8 Machine Learning in Cyber-Physical Systems Understand how machine learning can be applied to optimize and innovate CPS within telecommunications.

Key Topics: • Machine Learning Basics: Introduction to machine learning concepts.

• Applications in CPS: How machine learning enhances CPS functionality.

• Telecommunications: Using machine learning for innovative solutions in telecom systems.

35.9 Emerging Trends in CPS and Telecommunications Discover the latest research and technological trends shaping the future of CPS in the telecom sector.

Key Topics: • Research Developments: Latest research in CPS and telecommunications.

• Technological Trends: Emerging technologies impacting CPS.

• Future Prospects: Predicting the future of CPS in the telecommunications industry.

35.10 CPS Case Studies in Telecommunications Analyze real-world case studies where CPS has been effectively integrated into telecommunications systems.

Key Topics: • Case Studies: Detailed analysis of successful CPS implementations.

• Integration Strategies: Understanding strategies for integrating CPS in telecom systems.

• Lessons Learned: Key takeaways from real-world CPS applications in telecommunications.

36. Topics:
37. Master's Program in Artificial Intelligence and Machine Learning for Software Engineering This course provides an in-depth exploration of artificial intelligence and machine learning within the context of software engineering. It is designed to equip students with the knowledge and practical skills required to implement AI/ML solutions efficiently within software applications. The course covers fundamental concepts, advanced techniques, and real-world applications of AI and ML, fostering the development and

deployment of intelligent software systems.

4.1 .12.15..36.1.Introduction to Artificial Intelligence and Machine Learning This topic covers the fundamental concepts, history, and evolution of AI and ML, providing a basis for understanding how these technologies are poised to revolutionize software engineering.

36.2.Data Preprocessing and Feature Engineering This module focuses on preparing data for machine learning models, involving data cleaning, normalization, and transformation. Feature engineering techniques are also discussed to improve model performance.

36.3.Supervised Learning Techniques Discover various supervised learning algorithms such as regression, decision trees, and neural networks, and learn how to apply them within software systems.

36.4.Unsupervised Learning and Clustering Explore unsupervised learning methods, including clustering and dimensionality reduction, which are essential for extracting insights from unlabeled data.

36.5.Deep Learning and Neural Networks This topic delves into the structure and function of neural networks, focusing on deep learning techniques crucial for advancements in AI and complex software solutions.

36.6.Natural Language Processing Gain an understanding of techniques to process and analyze human language data, facilitating the creation of AI-driven software that can comprehend and interact with text.

36.7.AI/ML in Software Development Lifecycle Learn how AI and ML can be integrated into different stages of software development, from requirement gathering to deployment, enhancing software quality and performance.

36.8.Ethical and Responsible AI Address the ethical considerations and responsibilities in AI, focusing on issues such as bias,

36.8.Deployment and Scaling of AI Solutions Learn the practical considerations and challenges of deploying and scaling AI/ML solutions in production environments, ensuring they meet performance and reliability standards.

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37.2 Introduction to Artificial Intelligence and Machine Learning This topic covers the fundamental concepts, history, and evolution of AI and ML, providing a basis for understanding how these technologies are poised to revolutionize software engineering.

Key Topics: • Fundamental Concepts: Basics of AI and ML, including key definitions and principles.

• History and Evolution: Tracing the development of AI and ML over time.

• Impact on Software Engineering: Understanding how AI and ML are transforming the field of software engineering.

37.3 Data Preprocessing and Feature Engineering This module focuses on preparing data for machine learning models, involving data cleaning, normalization, and transformation. Feature engineering techniques are also discussed to improve model performance.

Key Topics: • Data Cleaning: Techniques for handling missing values, outliers, and inconsistencies in data.

• Normalization and Transformation: Methods for scaling and transforming data for better model performance.

• Feature Engineering: Creating and selecting relevant features to enhance model accuracy.

37.4 Supervised Learning Techniques Discover various supervised learning algorithms such as regression, decision trees, and neural networks, and learn how to apply them within software systems.

Key Topics: • Regression: Linear and logistic regression techniques.

• Decision Trees: Understanding how decision trees work and their applications.

• Neural Networks: Basics of neural networks and how they can be used in supervised learning.

37.5 Unsupervised Learning and Clustering Explore unsupervised learning methods, including clustering and dimensionality reduction, which are essential for extracting insights from unlabeled data.

Key Topics: • Clustering: Techniques such as K-means, hierarchical clustering, and DBSCAN.

• Dimensionality Reduction: Methods like PCA (Principal Component Analysis) and t-SNE.

• Applications: Real-world applications of unsupervised learning in software systems.

37.6 Deep Learning and Neural Networks This topic delves into the structure and function of neural networks, focusing on deep learning techniques crucial for advancements in AI and complex software solutions.

Key Topics: • Deep Learning: Understanding deep learning architectures like CNNs (Convolutional Neural Networks) and RNNs (Recurrent Neural Networks).

• Neural Network Structures: Layers, activation functions, and backpropagation.

• Advanced Techniques: Exploring advanced topics such as transfer learning and generative adversarial networks (GANs).

37.7 Natural Language Processing Gain an understanding of techniques to process and analyze human language data, facilitating the creation of AI-driven software that can comprehend and interact with text.

Key Topics: • Text Preprocessing: Techniques for tokenization, stemming, and lemmatization.

• NLP Models: Understanding models like Word2Vec, BERT, and GPT.

• Applications: Implementing NLP in chatbots, sentiment analysis, and other applications.

37.8 AI/ML in Software Development Lifecycle Learn how AI and ML can be integrated into different stages of software development, from requirement gathering to deployment, enhancing software quality and performance.

Key Topics: • Requirement Gathering: Using AI for requirement analysis and specification.

• Development: Incorporating AI/ML algorithms into software development processes.

• Testing: Automated testing and bug detection using AI.

• Deployment: Best practices for deploying AI/ML solutions in production environments.

37.9 Ethical and Responsible AI Address the ethical considerations and responsibilities in AI, focusing on issues such as bias, transparency, and accountability.

Key Topics: • Bias and Fairness: Identifying and mitigating biases in AI models.

• Transparency: Ensuring transparency in AI decision-making processes.

• Accountability: Establishing accountability for AI outcomes and decisions.

37.10 Deployment and Scaling of AI Solutions Learn the practical considerations and challenges of deploying and scaling AI/ML solutions in production environments, ensuring they meet performance and reliability standards.

Key Topics: • Deployment Challenges: Overcoming challenges in deploying AI solutions.

• Scaling Techniques: Techniques for scaling AI/ML models to handle large volumes of data.

• Performance Monitoring: Ensuring ongoing performance and reliability of AI solutions.

These courses provide a comprehensive understanding of artificial intelligence and machine learning for software engineering, equipping students with the knowledge and skills to innovate and lead in this rapidly evolving field

37..Topics: 4.1 .12.15.37.1.Advanced Studies in Autonomous Vehicles and Drones for Electric Vehicle Engineering This course provides an in-depth exploration of the engineering principles and technological innovations driving autonomous vehicles and drones. Focused within the field of Electric Vehicle Engineering, the curriculum bridges the gap between hardware design, software development, and system integration to equip students with the skills to design, test, and refine autonomous systems.

37.1.Introduction to Autonomous Systems An overview of autonomous vehicle and drone technologies, including historical development and future trends.

37.2Electric Vehicle Engineering Basics Foundational concepts of electric vehicle engineering, including battery technology and electric motor design.

37.3.Sensor Technologies and Data Processing Understanding the sensors used in autonomous systems, including LIDAR, RADAR, and cameras, as well as data processing algorithms.

37.4.Machine Learning and AI for Autonomous Systems Exploration of machine learning and artificial intelligence applications in autonomous decision-making and navigation.

37.5.Communication Networks and IoT Study of communication networks and the role of IoT in connecting autonomous vehicles and drones.

37.6.Control Systems for Autonomous Vehicles Examination of control systems used for vehicle dynamics and operational management in autonomous vehicles.

37.7Ethical and Regulatory Aspects Discussion on the ethical implications and regulatory challenges associated with the deployment of autonomous vehicles and drones.

37.8.Testing and Validation of Autonomous Systems Processes involved in testing and validation methodologies to ensure the safety and reliability of autonomous systems.

37.9.Integration of Renewable Energy in Autonomous Systems Integration of renewable energy sources like solar and wind power into autonomous systems to enhance sustainability.---

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37.2 Introduction to Autonomous Systems An overview of autonomous vehicle and drone technologies, including historical development and future trends.

Key Topics: • Historical Development: Tracing the evolution of autonomous systems from inception to present day

day.

• Technologies: Key technologies driving autonomous vehicles and drones.

• Future Trends: Predicting the future advancements and trends in autonomous systems.

37.3 Electric Vehicle Engineering Basics Foundational concepts of electric vehicle engineering, including battery technology and electric motor design.

Key Topics: • Battery Technology: Understanding the types, design, and performance of batteries used in electric vehicles.

• Electric Motor Design: Basics of electric motor functionality and design.

• Charging Systems: Overview of charging infrastructure and technologies.

37.4 Sensor Technologies and Data Processing Understanding the sensors used in autonomous systems, including LIDAR, RADAR, and cameras, as well as data processing algorithms.

Key Topics: • LIDAR and RADAR: Functionality and applications in autonomous systems.

• Cameras and Imaging: Role of cameras in autonomous navigation and obstacle detection.

• Data Processing Algorithms: Techniques for processing and analyzing sensor data.

37.5 Machine Learning and AI for Autonomous Systems Exploration of machine learning and artificial intelligence applications in autonomous decision-making and navigation.

Key Topics: • Machine Learning: Applying ML algorithms for autonomous systems.

• AI Decision-Making: Implementing AI for navigation and obstacle avoidance.

• Real-World Applications: Case studies of AI and ML in autonomous vehicles and drones.

37.6 Communication Networks and IoT Study of communication networks and the role of IoT in connecting autonomous vehicles and drones.

Key Topics: • Communication Protocols: Understanding the protocols used in autonomous vehicle networks.

• IoT Integration: How IoT devices enhance connectivity in autonomous systems.

• Network Security: Ensuring secure communication in autonomous networks.

37.7 Control Systems for Autonomous Vehicles Examination of control systems used for vehicle dynamics and operational management in autonomous vehicles.

Key Topics: • Vehicle Dynamics: Basics of vehicle control and dynamics.

• Control Algorithms: Algorithms used for maintaining stability and control.

• Operational Management: Managing the operations of autonomous systems.

37.8 Ethical and Regulatory Aspects Discussion on the ethical implications and regulatory challenges associated with the deployment of autonomous vehicles and drones.

Key Topics: • Ethical Considerations: Addressing the ethical issues in autonomous system deployment.

• Regulatory Frameworks: Understanding the regulations governing autonomous vehicles and drones.

• Compliance: Ensuring compliance with legal and ethical standards.

37.9 Testing and Validation of Autonomous Systems Processes involved in testing and validation methodologies to ensure the safety and reliability of autonomous systems.

Key Topics: • Testing Methodologies: Techniques for testing autonomous systems.

• Validation Processes: Ensuring the reliability and safety of autonomous vehicles.

• Case Studies: Real-world examples of testing and validation.

37.10 Integration of Renewable Energy in Autonomous Systems Investigating how renewable energy sources can be integrated into autonomous vehicles and drones to enhance sustainability.

Key Topics: • Renewable Energy Sources: Types of renewable energy used in autonomous systems.

• Integration Techniques: Methods for integrating renewable energy into vehicle design.

• Sustainability: Promoting sustainable practices in autonomous vehicle engineering

38.1.topics 4.1 .12.15.38.2:Specialist Engineering in Infrastructure and Contractors: Electrochemical Engineering This Master's degree course offers in-depth knowledge in electrochemical engineering within the realm of infrastructure and contractors. It is designed to equip students with the fundamental theories and practical skills necessary to tackle complex engineering projects involving electrochemical systems. From battery technologies to electrochemical processes, students will explore various applications and innovative solutions pertinent to sustainable infrastructure.

38.3.Introduction to Electrochemical Engineering Understand the basic principles of electrochemistry, including thermodynamics and kinetics, electron transfer processes, and the design and operation of electrochemical systems.

38.4.Battery Technologies for Infrastructure Explore the various types of battery technologies used in infrastructure, including lithium-ion, lead-acid, and emerging technologies such as solid-state batteries.

38.5.Fuel Cells and Their Applications Study the principles and applications of different types of fuel cells, focusing on their role in providing clean energy for infrastructure projects.

38.6.and Its Prevention Learn about the electrochemical processes involved in corrosion, methods of prevention, and materials selection to enhance infrastructure durability.

38.7..Electrochemical Sensors and Monitoring Understand the design and function of electrochemical sensors in monitoring environmental conditions and structural health in infrastructure projects.

38.8.Electrolysis and Industrial Processes Explore how electrolysis is used in various industrial processes, such as water splitting for hydrogen production and metal plating.

38.9.Sustainability and Electrochemical Engineering Discuss the impact of electrochemical engineering on sustainable infrastructure development and the environment.

.38.10.Advanced Topics in Electrochemical Engineering Delve into advanced topics and current research trends in electrochemical engineering, such as nanostructured materials and next-generation energy systems.

38.2 Specialist Engineering in Infrastructure and Contractors: Electrochemical Engineering This Master's degree course offers in-depth knowledge in electrochemical engineering within the realm of infrastructure and contractors. It is designed to equip students with the fundamental theories and practical skills necessary to tackle complex engineering projects involving electrochemical systems. From battery technologies to electrochemical processes, students will explore various applications and innovative solutions pertinent to sustainable infrastructure.

38.3 Introduction to Electrochemical Engineering Understand the basic principles of electrochemistry, including thermodynamics and kinetics, electron transfer processes, and the design and operation of electrochemical systems.

Key Topics: • Thermodynamics and Kinetics: Fundamental principles governing electrochemical reactions.

• Electron Transfer Processes: Mechanisms of electron transfer in electrochemical systems.

• System Design and Operation: Designing and operating efficient electrochemical systems.

38.4 Battery Technologies for Infrastructure Explore the various types of battery technologies used in infrastructure, including lithium-ion, lead-acid, and emerging technologies such as solid-state batteries.

Key Topics: • Lithium-ion Batteries: Structure, function, and applications.

• Lead-acid Batteries: Traditional uses and modern improvements.

• Emerging Technologies: Exploring the potential of solid-state and other advanced battery technologies.

38.5 Fuel Cells and Their Applications Study the principles and applications of different types of fuel cells, focusing on their role in providing clean energy for infrastructure projects.

Key Topics: • Types of Fuel Cells: Proton exchange membrane (PEM), solid oxide (SOFC), and others.

• Clean Energy Production: How fuel cells contribute to sustainable energy solutions.

• Infrastructure Applications: Real-world applications of fuel cells in infrastructure projects.

38.6 Corrosion and Its Prevention Learn about the electrochemical processes involved in corrosion, methods of prevention, and materials selection to enhance infrastructure durability.

Key Topics: • Corrosion Mechanisms: Understanding how and why corrosion occurs.

• Prevention Methods: Techniques to prevent and control corrosion.

• Materials Selection: Choosing materials to enhance durability and prevent corrosion.

38.7 Electrochemical Sensors and Monitoring Understand the design and function of electrochemical sensors in monitoring environmental conditions and structural health in infrastructure projects.

Key Topics: • Sensor Design: Principles of designing effective electrochemical sensors.

• Environmental Monitoring: Using sensors to monitor environmental conditions.

• Structural Health Monitoring: Applications in assessing the health and integrity of infrastructure.

38.8 Electrolysis and Industrial Processes Explore how electrolysis is used in various industrial processes, such as water splitting for hydrogen production and metal plating.

Key Topics: • Electrolysis Basics: Understanding the principles of electrolysis.

• Hydrogen Production: Using electrolysis for sustainable hydrogen generation.

• Industrial Applications: Applying electrolysis in metal plating and other industrial processes.

38.9 Sustainability and Electrochemical Engineering Discuss the impact of electrochemical engineering on sustainable infrastructure development and the environment.

Key Topics: • Sustainability Principles: Integrating sustainability into electrochemical engineering practices.

• Environmental Impact: Assessing and mitigating the environmental impact of electrochemical processes.

• Sustainable Development: Promoting sustainable infrastructure through innovative electrochemical solutions.

38.10 Advanced Topics in Electrochemical Engineering Delve into advanced topics and current research trends in electrochemical engineering, such as nanostructured materials and next-generation energy systems.

Key Topics: • Nanostructured Materials: Exploring the role of nanotechnology in electrochemical engineering.

• Next-Generation Energy Systems: Innovations in energy systems for sustainable infrastructure.

• Current Research Trends: Investigating the latest advancements and research in the field.

These courses provide a comprehensive understanding of electrochemical engineering in infrastructure and contractors, equipping students with the knowledge and skills to tackle complex engineering projects and promote sustainable developme

40.Topics

4.1 .12.15..40.1Topics:Energy Storage and Battery Technology This course explores advanced concepts in energy storage with a focus on battery technologies, essential for the integration of renewable energy sources. Students will gain an in-depth understanding of various energy storage systems, their applications, and the technological advancements driving the sector. The course is designed for graduate students in the Master's program in renewable energy, providing both theoretical knowledge and practical insights.

40.2.Introduction to Energy Storage Systems An overview of energy storage technologies and their importance in the modern energy landscape.

40.3.Battery Chemistry and Physics Understanding the fundamental principles of various battery chemistries, including lithium-ion, lead-acid, and emerging technologies.

40.4.Design and Functionality of Battery Cells Exploration of the design and operational principles of individual battery cells, and how they combine to form larger battery systems.

40.5.Applications of Battery Storage Examine how battery storage is used in various sectors such as electric vehicles, grid storage, and portable electronics.

40.6.Efficiency and Performance Measurements Learn about the metrics used to measure the performance and efficiency of battery systems.

40.7.Safety and Environmental Impacts Discussion of the safety protocols for batteries and their environmental impact, including recycling and waste management.

40.8.Advanced Energy Storage Technologies Explore cutting-edge advancements in energy storage beyond current battery technology, such as supercapacitors and flow batteries.

40.9.Policy and Economics of Energy Storage Examine the economic impacts, policy considerations, and market dynamics of implementing energy storage solutions.

40.10.Future Trends in Battery Technology Insights into the future direction of battery technology research and its role in achieving a sustainable energy future.

41.1.Topics: 41.2.Advanced Robotic Process Automation in Electrical Engineering This course aims to equip students with advanced knowledge and practical skills in implementing Robotic Process Automation (RPA) within the field of Electrical Engineering. The curriculum addresses the integration of RPA technologies to streamline and optimize engineering processes, focusing on automating complex electrical engineering tasks.

41.3.Introduction to Robotic Process Automation An overview of RPA, its significance in the industry, and its application in electrical engineering.

41.4.RPA Tools and Technologies Explore popular RPA tools like UiPath, Automation Anywhere, and Blue Prism and their specific applications in engineering.

41.5.Automating Electrical Design Processes Learn how to automate repetitive tasks in electrical design using RPA to increase efficiency and reduce human error.

41.6.Data Migration and Management Understanding the role of RPA in handling data migration and management in electrical engineering projects.

41.7.RPA in Control Systems Applications of RPA in the automation of control systems and simulation processes within electrical engineering.

41.8.Machine Learning and RPA Integrating machine learning with RPA for enhanced decision-making and predictive maintenance in electrical engineering.

41.9.RPA and IoT in Electrical Systems Exploring the synergy between RPA and IoT to develop smart electrical systems with improved functionality and efficiency.

41.10.Security and Ethics in RPA Understanding the ethical considerations and security challenges associated with the deployment of RPA in electrical engineering.

1.2 Advanced Robotic Process Automation in Electrical Engineering This course aims to equip students with advanced knowledge and practical skills in implementing Robotic Process Automation (RPA) within the field of Electrical Engineering. The curriculum addresses the integration of RPA technologies to streamline and optimize engineering processes, focusing on automating complex electrical engineering tasks.

41.3 Introduction to Robotic Process Automation An overview of RPA, its significance in the industry, and its application in electrical engineering.

Key Topics: • RPA Basics: Understanding the fundamentals of Robotic Process Automation.

• Industry Significance: Exploring the importance and impact of RPA in various industries.

• Applications in Electrical Engineering: Specific use cases and benefits of RPA in electrical engineering.

41.4 RPA Tools and Technologies Explore popular RPA tools like UiPath, Automation Anywhere, and Blue Prism and their specific applications in engineering.

Key Topics: • UiPath: Features and applications of UiPath in automating engineering tasks.

• Automation Anywhere: Understanding how Automation Anywhere can be used in electrical engineering.

• Blue Prism: Exploring Blue Prism's capabilities and use cases in the industry.

41.5 Automating Electrical Design Processes Learn how to automate repetitive tasks in electrical design using RPA to increase efficiency and reduce human error.

Key Topics: • Repetitive Task Automation: Identifying and automating repetitive tasks in electrical design.

• Efficiency Improvement: Enhancing efficiency and productivity through automation.

• Error Reduction: Minimizing human errors by implementing RPA solutions.

41.6 Data Migration and Management Understanding the role of RPA in handling data migration and management in electrical engineering projects.

Key Topics: • Data Migration: Techniques for automating data migration processes.

• Data Management: Using RPA to manage and organize large datasets.

• Project Applications: Implementing RPA for data handling in engineering projects.

41.7 RPA in Control Systems Applications of RPA in the automation of control systems and simulation processes within electrical engineering.

Key Topics: • Control Systems Automation: Using RPA to automate control system processes.

• Simulation Processes: Enhancing simulation processes through automation

- Simulation Processes: Enhancing simulation processes through automation.

• Case Studies: Real-world examples of RPA applications in control systems.

41.8 Machine Learning and RPA Integrating machine learning with RPA for enhanced decision-making and predictive maintenance in electrical engineering.

Key Topics: • Machine Learning Integration: Combining ML algorithms with RPA for advanced automation.

• Predictive Maintenance: Using ML and RPA for proactive maintenance strategies.

• Enhanced Decision-Making: Improving decision-making processes through intelligent automation.

41.9 RPA and IoT in Electrical Systems Exploring the synergy between RPA and IoT to develop smart electrical systems with improved functionality and efficiency.

Key Topics: • RPA and IoT Integration: Understanding how RPA and IoT can work together.

• Smart Systems: Developing smart electrical systems using RPA and IoT.

• Efficiency and Functionality: Enhancing system functionality and efficiency through integration.

41.10 Security and Ethics in RPA Understanding the ethical considerations and security challenges associated with the deployment of RPA in electrical engineering.

Key Topics: • Ethical Considerations: Addressing ethical issues in RPA implementation.

• Security Challenges: Identifying and mitigating security risks in RPA systems.

• Best Practices: Implementing best practices for secure and ethical RPA deployment.

These courses provide a comprehensive understanding of advanced robotic process automation in electrical engineering, equipping students with the knowledge and skills to innovate and lead in this field.

44...Topics grand circulum summarise resolve probme outcome exercise :

44.1 reating a comprehensive and accurate calculation formulation for a master's degree in electrical engineering typically involves several steps. These can vary depending on the specific topic or project you are working on. Here, I'll outline a general approach to developing a calculation formulation in the context of electrical engineering:

44..1. Define the Problem • Clearly state the engineering problem or objective.

• Identify the variables and parameters involved.

• Determine the constraints and assumptions.

2. Develop the Mathematical Model • Formulate the equations governing the physical system (e.g., Ohm's law, Kirchhoff's laws, Maxwell's equations).

• Use appropriate mathematical techniques to model the system (e.g., differential equations, linear algebra).

3. Simplify the Equations • Apply any necessary simplifications or approximations.

• Reduce the equations to a solvable form.

4. Analytical Solution (if possible) • Solve the equations analytically using mathematical methods.

• Check the validity of the analytical solution within the defined constraints.

5. Numerical Solution (if necessary) • If the analytical solution is not feasible, develop a numerical solution.

• Use numerical methods (e.g., finite element method, numerical integration).

6. Simulation and Validation • Implement the model in simulation software (e.g., MATLAB, Simulink).

• Validate the results with experimental data or known benchmarks.

7. Optimization (if applicable) • Optimize the solution for desired performance criteria (e.g., efficiency, cost).

• Use optimization techniques (e.g., genetic algorithms, gradient descent).

Example Calculation: Load Flow Analysis in Power Systems Here's a simplified example of a calculation formulation for load flow analysis in power systems:

Step 1: Define the Problem • Objective: Determine the voltage and phase angle at each bus in the power system.

• Variables: Bus voltages (V), phase angles (θ), real power (P), reactive power (Q).

• Constraints: Power balance equations, voltage limits.

Step 2: Develop the Mathematical Model • Use the power flow equations:
$P_i = V_i \sum_{j=1}^{n} V_j (G_{ij} \cos\theta_{ij} + B_{ij} \sin\theta_{ij})$ $Q_i = V_i \sum_{j=1}^{n} V_j (G_{ij} \sin\theta_{ij} - B_{ij} \cos\theta_{ij})$ Where GijG_{ij} and BijB_{ij} are the conductance and susceptance of the transmission line between buses ii and jj.

Step 3: Simplify the Equations • Apply any necessary assumptions (e.g., flat start method with initial voltage guesses).

Step 4: Analytical Solution • Not feasible for large power systems.

Step 5: Numerical Solution • Use the Newton-Raphson method to solve the power flow equations iteratively.

Step 6: Simulation and Validation • Implement the Newton-Raphson method in MATLAB.

• Validate the results with a test power system.

Step 7: Optimization • Optimize the power flow to minimize losses or improve voltage stability.

By following these steps, you can create a robust and accurate calculation formulation for various electrical engineering problems. If you need help with a specific calculation or further details on any step, feel free to ask!

Electrical engineering encompasses a wide range of topics that involve various calculations. Here are some common areas and the types of calculations typically associated with them:

1. Circuit Analysis • Ohm's Law: V=IRV = IR

• Power Calculations: P=VIP = VI, P=I2RP = I^2R

• Kirchhoff's Laws: Kirchhoff's Voltage Law (KVL) and Kirchhoff's Current Law (KCL)

• Impedance and Reactance: Calculating the impedance (ZZ) of AC circuits, inductive reactance (XL=2πfLX_L = 2\pi fL), and capacitive reactance (XC=12πfCX_C = \frac{1}{2\pi fC})

2. Electromagnetics • Coulomb's Law: F=keq1q2r2F = k_e \frac{q_1 q_2}{r^2}

• Electric Field Calculations: E=FqE = \frac{F}{q}

• Magnetic Field Calculations: Using Biot-Savart Law and Ampère's Law

3. Signal Processing • Fourier Transforms: Transforming signals from time domain to frequency domain

• Laplace Transforms: For analyzing linear time-invariant systems

• Z-Transforms: Used in digital signal processing for discrete-time signals

4. Control Systems • Transfer Functions: H(s)=Y(s)X(s)H(s) = \frac{Y(s)}{X(s)}

• Stability Analysis: Using Routh-Hurwitz criterion, Nyquist criterion, and Bode plots

• PID Controller Tuning: Calculations for proportional, integral, and derivative gains

5. Power Systems • Load Flow Analysis: Solving the power flow equations using methods like Newton-Raphson or Gauss-Seidel

• Short Circuit Calculations: Determining the fault current levels in a power system

• Power Factor Correction: Calculations to improve the power factor of electrical loads

6. Electronics • Transistor Biasing: Calculations for setting the operating point of transistors

• Amplifier Design: Gain and bandwidth calculations for different types of amplifiers

• Oscillator Design: Frequency and stability calculations for oscillators

7. Digital Systems • Logic Gates and Boolean Algebra: Simplifying Boolean expressions

• Flip-Flops and Counters: Timing and state analysis

• Digital Signal Processing: Sampling, quantization, and digital filter design

8. Communication Systems • Modulation Techniques: Calculations for AM, FM, and PM systems

• Signal-to-Noise Ratio (SNR): Calculating the quality of a signal

Bandwidth Calculations: Determining the bandwidth requirements for various

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10.INPUT X1 20. INPUT .X2 30. INPUT X3 40. INPUT X4 50,IN[UT X5 60. INPUT X6 60.INPUT .X7.

70.OUTPUT S1 80.OUTPUT.S2 90,OUTPUT S3 100.OUTPUT S4 110.OUTPUT S5 120 OUTPUT S6 130.OUTPUT S7 140.OUTPUT 150 SELECT REGISTER 150 OUTPUT HARDWARD
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Selection.TypeParagraph Selection.Paste ActiveDocument.Save ActiveWindow.ActivePane.VerticalPercentScrolled = 207 ActiveWindow.ActivePane.VerticalPercentScrolled = 202 ActiveWindow.ActivePane.VerticalPercentScrolled = 197 ActiveWindow.ActivePane.LargeScroll Down:=1 ActiveWindow.ActivePane.VerticalPercentScrolled = -75 ActiveWindow.ActivePane.VerticalPercentScrolled = -41 Windows("Doc8 drawing tshingombe fiston").Activate Windows("Doc2 drawing tshingombe").Activate ActiveWindow.ActivePane.VerticalPercentScrolled = 127 ActiveWindow.Close ActiveWindow.Close ActiveWindow.Close ActiveWindow.Close ActiveWindow.Close ChangeFileOpenDirectory "C:\Users\Library SIX\Desktop" ActiveDocument.SaveAs2 FileName:="Doc1 tshing.docx", FileFormat:= _ wdFormatXMLDocument, LockComments:=False, Password:="", AddToRecentFiles _ :=True, WritePassword:="", ReadOnlyRecommended:=False, EmbedTrueTypeFonts _ :=False, SaveNativePictureFormat:=False, SaveFormsData:=False, _ SaveAsAOCELetter:=False, CompatibilityMode:=15 ActiveWindow.Close Application.Quit End Sub Sub Macro3() ' ' Macro3 Macro ' 170.{ " IF (X1=0)+(X2=0)+(X3=0)+(X4=0)+(X5=0)+(X6=0)+(X7=0)+(X8=)THEN "} OR "SUB"" *CLICK"* ' *"&chr(10)&" "SELECT REGISTER .ELSE , CPU"=0 , ADRESSPIN = 000000000* ' *"&chr(10)&"180 END IF " IF (S1=0)+(S2=0)+(S3=0)+(S4=0)+(S5=0)+(S6=0)+(S7=0)+(S8=0)THEN "} OR "SUB"" CLICK* ' "&chr(10)&"EXECU ' Application.Run MacroName:="frm1" End Sub Sub Macro4() ' ' Macro4 Macro ' 170.{ " IF (X1=0)+(X2=0)+(X3=0)+(X4=0)+(X5=0)+(X6=0)+(X7=0)+(X8=0)THEN "} OR "SUB"" *CLICK"* ' *"&chr(10)&" SELECT REGISTER .ELSE , CPU , ' "&chr(10)&"180 END IF " IF (S1=1)+(S2=1)+(S3=1)+(S4=1)+(S5=1)+(S6=1)+(S7=1)+(S8=1)THEN "} OR "SUB"" CLICK* ' "&chr(10)&"EXECUTION LOOP '

' Application.Run MacroName:="frm1" ActiveWindow.ActivePane.VerticalPercentScrolled = 119 Selection.Copy Application.Run MacroName:="frm1" End Sub Sub Macro5() ' ' Macro5 Macro ' 10.INPUT X1 ' "&chr(10)&"20. INPUT .X2 ' "&chr(10)&"30. INPUT X3 ' "&chr(10)&"40. INPUT X4 ' "&chr(10)&"50,IN[UT X5 ' "&chr(10)&"60. INPUT X6 ' "&chr(10)&"60.INPUT .X7. '

' "&chr(10)&" 70.OUTPUT S1 ' "&chr(10)&"80.OUTPUT.S2 ' "&chr(10)&"90,OUTPUT S3 ' "&chr(10)&"100.OUTPUT S4 ' "&chr(10)&"110.OUTPUT S5 ' "&chr(10)&"120 OUTPUT S6 ' "&chr(10)&"130.OUTPUT S7 ' "&chr(10)&"140.OUTPUT ' "&chr(10)&"150 SELECT REGISTER ' "&chr(10)&"150 OUTPUT HARDW ' Application.Run MacroName:="frm1" End Sub Sub frm1() ' ' frm1 Macro ' '

End Sub

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Sub Macro1() ' ' Macro1 Macro ' visual basic atm program .sten object by system .event)hand ' "&chr(10)&"public class transaction box ' "&chr(10)&"const service as decimal =6.5 ' "&chr(10)&"const pin as integer +9343 ' "&chr(10)&"dim balance as decimal =150 ' "&chr(10)&"private sub label 12_click (by sender System.object event arg handles labe ' End Sub Sub Macro2() ' ' Macro2 Macro ' type meter three phase ac static watt hous smart ' "&chr(10)&"metering algorith ' "&chr(10)&"accuracy nomial voltage mettering frequence metering const functionality current sensors energy pulse energy temper detection remote communication iec 62056 extrevm internal battery ' ActiveWindow.ActivePane.VerticalPercentScrolled = 205 ActiveWindow.ActivePane.VerticalPercentScrolled = 146 Selection.TypeText Text:= _ "----------" Selection.TypeText Text:= _ "----------" Selection.TypeText Text:="-------" Selection.TypeParagraph Selection.PasteAndFormat (wdFormatOriginalFormatting) ActiveWindow.ActivePane.VerticalPercentScrolled = 146 Selection.TypeParagraph Selection.TypeParagraph Selection.TypeParagraph Selection.TypeParagraph Selection.TypeParagraph Selection.TypeParagraph Selection.TypeParagraph Selection.TypeParagraph Selection.TypeParagraph Selection.TypeParagraph Selection.TypeParagraph Selection.TypeParagraph Selection.TypeParagraph Selection.TypeParagraph Selection.TypeParagraph

Selection.TypeParagraph Selection.TypeParagraph Selection.TypeParagraph Selection.TypeParagraph Selection.TypeParagraph Selection.TypeParagraph Selection.TypeParagraph Selection.TypeParagraph Selection.TypeParagraph Selection.TypeParagraph Selection.TypeParagraph Selection.Paste ActiveDocument.Save ActiveWindow.ActivePane.VerticalPercentScrolled = 207 ActiveWindow.ActivePane.VerticalPercentScrolled = 202 ActiveWindow.ActivePane.VerticalPercentScrolled = 197 ActiveWindow.ActivePane.LargeScroll Down:=1 ActiveWindow.ActivePane.VerticalPercentScrolled = -75 ActiveWindow.ActivePane.VerticalPercentScrolled = -41 Windows("Doc8 drawing tshingombe fiston").Activate Windows("Doc2 drawing tshingombe").Activate ActiveWindow.ActivePane.VerticalPercentScrolled = 127 ActiveWindow.Close ActiveWindow.Close ActiveWindow.Close ActiveWindow.Close ActiveWindow.Close ChangeFileOpenDirectory "C:\Users\Library SIX\Desktop" ActiveDocument.SaveAs2 FileName:="Doc1 tshing.docx", FileFormat:= _ wdFormatXMLDocument, LockComments:=False, Password:="", AddToRecentFiles _ :=True, WritePassword:="", ReadOnlyRecommended:=False, EmbedTrueTypeFonts _ :=False, SaveNativePictureFormat:=False, SaveFormsData:=False, _ SaveAsAOCELetter:=False, CompatibilityMode:=15 ActiveWindow.Close Application.Quit End Sub Sub Macro3() ' ' Macro3 Macro ' 170.{ " IF (X1=0)+(X2=0)+(X3=0)+(X4=0)+(X5=0)+(X6=0)+(X7=0)+(X8=)THEN "} OR "SUB"" *CLICK"* ' *"&chr(10)&" "SELECT REGISTER .ELSE , CPU"=0 , ADRESSPIN = 000000000* ' *"&chr(10)&"180 END IF " IF (S1=0)+(S2=0)+(S3=0)+(S4=0)+(S5=0)+(S6=0)+(S7=0)+(S8=0)THEN "} OR "SUB""* CLICK ' "&chr(10)&"EXECU ' Application.Run MacroName:="frm1" End Sub Sub Macro4() ' ' Macro4 Macro ' 170.{ " IF (X1=0)+(X2=0)+(X3=0)+(X4=0)+(X5=0)+(X6=0)+(X7=0)+(X8=0)THEN "} OR "SUB"" *CLICK"* ' *"&chr(10)&" SELECT REGISTER .ELSE , CPU , ' "&chr(10)&"180 END IF " IF (S1=1)+(S2=1)+(S3=1)+(S4=1)+(S5=1)+(S6=1)+(S7=1)+(S8=1)THEN "} OR "SUB""* CLICK ' "&chr(10)&"EXECUTION LOOP '

' Application.Run MacroName:="frm1" ActiveWindow.ActivePane.VerticalPercentScrolled = 119 Selection.Copy Application.Run MacroName:="frm1" End Sub Sub Macro5() ' ' Macro5 Macro ' 10.INPUT X1 ' "&chr(10)&"20. INPUT .X2 ' "&chr(10)&"30. INPUT X3 ' "&chr(10)&"40. INPUT X4 ' "&chr(10)&"50,IN[UT X5 ' "&chr(10)&"60. INPUT X6 ' "&chr(10)&"60.INPUT .X7. '

' "&chr(10)&" 70.OUTPUT S1 ' "&chr(10)&"80.OUTPUT.S2 ' "&chr(10)&"90,OUTPUT S3 ' "&chr(10)&"100.OUTPUT S4 ' "&chr(10)&"110.OUTPUT S5 ' "&chr(10)&"120 OUTPUT S6 ' "&chr(10)&"130.OUTPUT S7 ' "&chr(10)&"140.OUTPUT ' "&chr(10)&"150 SELECT REGISTER ' "&chr(10)&"150 OUTPUT HARDW ' Application.Run MacroName:="frm1" End Sub Sub frm1() ' ' frm1 Macro ' '

End Sub Sub Macro6() ' ' Macro6 Macro ' · Signal Integration: '

' "&chr(10)&"o To measure the total amount of analyte over time, integration of the sensor signal I(t)I(t) is performed: $$ Q = \int_0^T I(t) , dt $$ '

' "&chr(10)&"o Where QQ is the total charge, I(t)I(t) is the current as a function of time, ' End Sub Sub Macro7() ' ' Macro7 Macro ' Derivative Calculations: ' "&chr(10)&"· Rate of Change: '

' "&chr(10)&"o To assess the rate of change of the analyte concentration, the derivative of the sensor signal can be calculated: $$ \frac{dC}{dt} = k \frac{dI}{dt} $$ '

' "&chr(10)&"o Where CC is the concentration, II is t ' Application.Run MacroName:="Macro1" End Sub Sub Macro8() ' ' Macro8 Macro ' Water Splitting for Hydrogen Production: ' "&chr(10)&"· Integral Calculations: '

' "&chr(10)&"o Total Hydrogen Production: $$ H_2 (g) = \int_0^T \left(\frac{I(t)}{2F} \right) dt $$ '

' "&chr(10)&"§ Where H2H_2 is the amount of hydrogen gas produced, I(t)I(t) is the current as a f ' End Sub Sub Macro9() ' ' Macro9 Macro ' Metal Plating: ' "&chr(10)&"· Integral Calculations: '

' "&chr(10)&"o Total Metal Deposited: $$ M = \int_0^T \left(\frac{I(t) \cdot M}{nF} \right) dt $$ '

' "&chr(10)&"§ Where MM is the mass of the metal deposited, I(t)I(t) is the current as a function of time, nn is the number o ' End Sub Sub Macro10() ' ' Macro10 Macro ' ' "&chr(10)&"Energy Efficiency: ' "&chr(10)&"· Integral Calculations: '

' "&chr(10)&"o Energy Consumption: $$ E = \int_0^T P(t) , dt $$ '

' "&chr(10)&"§ Where EE is the total energy consumption, P(t)P(t) is the power consumption as a function of time, and TT is the total time period. '

' "&chr(10)&"Res ' Application.Run MacroName:="Macro1" End Sub Sub Macro11() ' ' Macro11 Macro ' ' "&chr(10)&"o Total Time Spent on Repetitive Tasks: $$ T = \int_0^N t_i , di $$ '

' "&chr(10)&"§ Where TT is the total time, tit_i is the time spent on each task, and NN is the total number of tasks. '

' "&chr(10)&"· Derivative Calculations: '

' "&chr(10)&"o Rate of Task Completion: $$
' End Sub Sub Macro12() ' ' Macro12 Macro ' ' "&chr(10)&"· Integral Calculations: '

' "&chr(10)&"o Total Efficiency Gain: $$ E = \int_0^T \frac{P_a - P_m}{P_m} , dt $$ '

' "&chr(10)&"§ Where EE is the efficiency gain, PaP_a is the productivity with automation, PmP_m is the productivity without automation, and TT is the to ' End Sub Sub Macro13() ' ' Macro13 Macro ' Camera Operation and Techniques: '

' "&chr(10)&"· Integral Calculations: '

' "&chr(10)&"o Total Recording Time: $$ T_{\text{recording}} = \int_0^N t_i , di $$ '

' "&chr(10)&"§ Where TrecordingT_{\text{recording}} is the total recording time, tit_i is the time for each segment, an ' End Sub Sub Macro14() ' ' Macro14 Macro ' · Use the power flow equations:
$P_i = V_i \sum_{j=1}^{n} V_j (G_{ij} \cos\theta_{ij} + B_{ij} \sin\theta_{ij})$ $Q_i = V_i \sum_{j=1}^{n} V_j (G_{ij} \sin\theta_{ij} - B_{ij} \cos\theta_{ij})$ Where GijG_{ij} and BijB_{ij} are the conducta ' End Sub Sub Macro15() ' ' Macro15 Macro ' ' "&chr(10)&"4. Control Systems ' "&chr(10)&"· Transfer Functions: H(s)=Y(s)X(s)H(s) = \frac{Y(s)}{X(s)} '

' "&chr(10)&"· Stability Analysis: Using Routh-Hurwitz criterion, Nyquist criterion, and Bode plots '

' End Sub Sub Macro16() ' ' Macro16 Macro ' - to calculate the Laplace and Fourier series Fourier a random vibrational signal ,signal aleatoire vibratoire in the context break down into a few steps. ' "&chr(10)&"1. Fourier series : the Fourier series and cosine function for periodic function \ (ft)) with per ' End Sub Sub Macro17() ' ' Macro17 Macro ' Biot-Savart Law: ' "&chr(10)&" The law is mathematically expressed as: ' "&chr(10)&" ' "&chr(10)&" B=μ04p?I dl×r^r2\mathbf{B} = \frac{\mu_0}{4\pi} \int \frac{I , d\mathbf{l} \times \hat{r}}{r^2}B=4pμ0???r2Idl×r^? ' "&chr(10)&" Where: ' "&chr(10)&" ' "&chr(10)&" B\mathbf{B}B is the magnetic field at a point, ' "&chr(10)&" μ0\mu_0μ0? i ' End Sub Sub Macro18() ' ' Macro18 Macro ' 2. Scope and Framework Applications ' "&chr(10)&"Power Systems: ' "&chr(10)&"· Energy Consumption Modeling: Apply integral formulations like: $E = \int P(t), dt$ Where P(t)P(t) is the power as a function of time and EE is the cumulativ ' End Sub Sub Macro19() ' ' Macro19 Macro ' 3. Integrating Market Trends ' "&chr(10)&"HNC Level Tasks: ' "&chr(10)&"· Derive load equations for single-phase circuits using simple relationships: $I = \frac{P}{V}$ Where II is current, PP is power, and VV is voltage. ' "&chr(10)&"HND Level Scenarios: ' "&chr(10)&"· Explore adv ' End Sub Sub Macro20() ' ' Macro20 Macro ' ' "&chr(10)&" Module subject average career guidance: ' "&chr(10)&" ' "&chr(10)&" ' "&chr(10)&" ' "&chr(10)&" -Module career (sum "a"+"b"+"c") ;(sum "d"+"e"+"f"); ("g"+"h"+"I").; ' "&chr(10)&" ' "&chr(10)&" '

' End Sub Sub Macro21() ' ' Macro21 Macro ' F=wICASS·MICASS+wEISA·MEISA,F = w_{\text{ICASS}} \cdot M_{\text{ICASS}} + w_{\text{EISA}} \cdot M_{\text{EISA}}, ' "&chr(10)&"where wICASS=0.4w_{\text{ICASS}} = 0.4 and wEISA=0.6w_{\text{EISA}} = 0.6. ' "&chr(10)&"Example: For a student wi ' End Sub Sub Macro22() ' ' Macro22 Macro ' Ptotal=?0Tf(t) dt,P_{\text{total}} = \int_0^T f(t) , dt, ' "&chr(10)&"where f(t)f(t): rate of improvement over a semester tt. ' "&chr(10)&"Example: Given f(t)=3t2+2tf(t) = 3t^2 + 2t, compute PtotalP_{\text{total}} over T=6T = 6: ' "&chr(10)&" ' "&chr(10)&"Ptotal=?06(3t2+2t) dt=[t3+t2]06=216+36=252 ' End Sub Sub Macro23() ' ' Macro23 Macro ' ' "&chr(10)&"Q=?0TkA?T dt Q =

\int_0^T k A \Delta T , dt, ' "&chr(10)&"where kk: thermal conductivity, AA: surface area, ?T\Delta T: temperature gradient. ' "&chr(10)&"Example: For k=0.8 W/mKk = 0.8 , \text{W/mK}, A=2 m2A = 2 , ' End Sub

Sub Macro1() ' ' Macro1 Macro ' visual basic atm program .sten object by system .event)hand ' "&chr(10)&"public class transaction box ' "&chr(10)&"const service as decimal =6.5 ' "&chr(10)&"const pin as integer +9343 ' "&chr(10)&"dim balance as decimal =150 ' "&chr(10)&"private sub label 12_click (by sender System.object event arg handles labe ' End Sub Sub Macro2() ' ' Macro2 Macro ' type meter three phase ac static watt hous smart ' "&chr(10)&"metering algorith ' "&chr(10)&"accuracy nomial voltage mettering frequence metering const functionality current sensors energy pulse energy temper detection remote communication iec 62056 extrevm internal battery ' ActiveWindow.ActivePane.VerticalPercentScrolled = 205 ActiveWindow.ActivePane.VerticalPercentScrolled = 146 Selection.TypeText Text:= _ "--" Selection.TypeText Text:= _ "--" Selection.TypeText Text:="-------" Selection.TypeParagraph Selection.PasteAndFormat (wdFormatOriginalFormatting) ActiveWindow.ActivePane.VerticalPercentScrolled = 146 Selection.TypeParagraph Selection.Paste ActiveDocument.Save ActiveWindow.ActivePane.VerticalPercentScrolled = 207 ActiveWindow.ActivePane.VerticalPercentScrolled = 202 ActiveWindow.ActivePane.VerticalPercentScrolled = 197 ActiveWindow.ActivePane.LargeScroll Down:=1 ActiveWindow.ActivePane.VerticalPercentScrolled = -75 ActiveWindow.ActivePane.VerticalPercentScrolled = -41 Windows("Doc8 drawing tshingombe fiston").Activate Windows("Doc2 drawing tshingombe").Activate ActiveWindow.ActivePane.VerticalPercentScrolled = 127 ActiveWindow.Close ActiveWindow.Close ActiveWindow.Close ActiveWindow.Close ActiveWindow.Close ChangeFileOpenDirectory "C:\Users\Library SIX\Desktop" ActiveDocument.SaveAs2 FileName:="Doc1 tshing.docx", FileFormat:= _ wdFormatXMLDocument, LockComments:=False, Password:="", AddToRecentFiles _ :=True, WritePassword:="", ReadOnlyRecommended:=False, EmbedTrueTypeFonts _ :=False, SaveNativePictureFormat:=False, SaveFormsData:=False, _ SaveAsAOCELetter:=False, CompatibilityMode:=15 ActiveWindow.Close Application.Quit End Sub Sub Macro3() ' ' Macro3 Macro ' 170.{ " IF (X1=0)+(X2=0)+(X3=0)+(X4=0)+(X5=0)+(X6=0)+(X7=0)+(X8=)THEN "} OR "SUB"" CLICK" ' "&chr(10)&" "SELECT REGISTER .ELSE , CPU"=0 , ADRESSPIN = 000000000 ' "&chr(10)&"180 END IF " IF (S1=0)+(S2=0)+(S3=0)+(S4=0)+(S5=0)+(S6=0)+(S7=0)+(S8=0)THEN "} OR "SUB"" CLICK ' "&chr(10)&"EXECU ' Application.Run MacroName:="frm1" End Sub Sub Macro4() ' ' Macro4 Macro ' 170.{ " IF (X1=0)+(X2=0)+(X3=0)+(X4=0)+(X5=0)+(X6=0)+(X7=0)+(X8=0)THEN "} OR "SUB"" CLICK" ' "&chr(10)&" SELECT REGISTER .ELSE , CPU , ' "&chr(10)&"180 END IF " IF (S1=1)+(S2=1)+(S3=1)+(S4=1)+(S5=1)+(S6=1)+(S7=1)+(S8=1)THEN "} OR "SUB"" CLICK ' "&chr(10)&"EXECUTION LOOP '

' Application.Run MacroName:="frm1" ActiveWindow.ActivePane.VerticalPercentScrolled = 119 Selection.Copy Application.Run MacroName:="frm1" End Sub Sub Macro5() ' ' Macro5 Macro ' 10.INPUT X1 ' "&chr(10)&"20. INPUT .X2 ' "&chr(10)&"30. INPUT X3 ' "&chr(10)&"40. INPUT X4 ' "&chr(10)&"50,IN[UT X5 ' "&chr(10)&"60. INPUT X6 ' "&chr(10)&"60.INPUT .X7. '

' "&chr(10)&" 70.OUTPUT S1 ' "&chr(10)&"80.OUTPUT.S2 ' "&chr(10)&"90,OUTPUT S3 ' "&chr(10)&"100.OUTPUT S4 ' "&chr(10)&"110.OUTPUT S5 ' "&chr(10)&"120 OUTPUT S6 ' "&chr(10)&"130.OUTPUT S7 ' "&chr(10)&"140.OUTPUT ' "&chr(10)&"150 SELECT REGISTER ' "&chr(10)&"150 OUTPUT HARDW ' Application.Run MacroName:="frm1" End Sub Sub frm1() ' ' frm1 Macro ' '

End Sub Sub Macro24() ' ' Macro24 Macro ' ' "&chr(10)&" (f(x,y)) the partial derivatives with respect to (x) ' "&chr(10)&" ' "&chr(10)&" Is denoted as (\ frac{\ partial f }{ partial x}) and with , ' "&chr(10)&" ' "&chr(10)&" Respect to \ (y) as (\ frac {\ partial f }{\ partial ,y }) ' "&chr(10)&" ' "&chr(10)&" Examp : [funct [f(

x,y)=x^2y+3xy^3] ' "&chr(10)&" ' "&chr(10)&" * Calcu ' End Sub Sub Macro6() ' ' Macro6 Macro ' ' "&chr(10)&" (f(x,y)) the partial derivatives with respect to (x) ' "&chr(10)&" ' "&chr(10)&" Is denoted as (\ frac{\ partial f }{ partial x}) and with , ' "&chr(10)&" ' "&chr(10)&" Respect to \ (y) as (\ frac {\ partial f }{\ partial ,y }) ' "&chr(10)&" ' "&chr(10)&" Examp : [funct [f(x,y)=x^2y+3xy^3] ' "&chr(10)&" ' "&chr(10)&" * Calcu ' End Sub Sub Macro7() ' ' Macro7 Macro ' ' "&chr(10)&" (f(x,y)), the total derivatives \ (DF) is given by : [DF = \ frac { \ partial f }{\ partial x }sx +\ frac{ \ partial }{ \ partial y } St \ ] ' "&chr(10)&" ' "&chr(10)&" Using the previous : \ [DF = 2xy+ 2y^2) ' "&chr(10)&" '

' End Sub Sub Macro8() ' ' Macro8 Macro ' 1. Fourier series : the Fourier series and cosine function for periodic function \ (ft)) with period (t) the Fourier series is. ' "&chr(10)&" ' "&chr(10)&" f(t)= a 0+\ sum ${n= 1}{\ infty} ' "&chr(10)&" ' "&chr(10)&" \ left + a_ n \ cos \ left \ left + } frac { 2\ pi not }{T} ' "&chr(10)&" ' "&chr(10)&" \ right) + b _ ' End Sub Sub Macro9() ' ' Macro9 Macro ' ' "&chr(10)&" .[R-{\ text t{ total }}= R1+R2+R3] ' "&chr(10)&" ' "&chr(10)&" . Substituting the values [R - { \ text { total }}= 10.\ text , { ohms }+ 20, text{ ohms}+30, text {ohms}], calculating ,[R - { \ text { total /}} = 60\ text { ohm }] '

' End Sub Sub Macro10() ' ' Macro10 Macro ' 0 ' "&chr(10)&" [Z =\ sqrt{R^ 2+(x-L-X_C)^2}] ' "&chr(10)&" ' "&chr(10)&" Where _(x_L= 2\ pi f L \ Pi .f.c} (capacitive reactance , ' "&chr(10)&" ' "&chr(10)&" -(X_C)=\ frac , {1}{2\ pi.f.c}}(capacitive reactance. ' "&chr(10)&" ' "&chr(10)&" -|(fl) is the frequency in Hertz (z) ' "&chr(10)&" ' "&chr(10)&" -(L/) is the inductance in Hertz (Hz) ' End Sub Sub Macro11() ' ' Macro11 Macro ' The power factor ,of is defined as the ratio of real power to apparent power , \ [\ text power factor ,of)}=\ frac ,{P}{s}] ' "&chr(10)&" ' "&chr(10)&" Where : .(P)= real power (w) ' "&chr(10)&" ' "&chr(10)&" .(S\)= apparent power ,(VA) '

' End Sub Sub Macro12() ' ' Macro12 Macro ' [S=\sqt{P^2+Q^2}] ' "&chr(10)&" ' "&chr(10)&" .value .real power ((P))=500w, ' "&chr(10)&" ' "&chr(10)&" .reactive power(\Q))=300VAR ' "&chr(10)&" ' "&chr(10)&" - calculate apparent power (s)[,S=\sqt{P^2t '

' End Sub Sub Macro13() ' ' Macro13 Macro ' ' "&chr(10)&" -where . ' "&chr(10)&" ' "&chr(10)&" |(a-O=| frac {1}{T} int- 0^ f(t)\dt) ' "&chr(10)&" ' "&chr(10)&" .+a-n = frac {2}{T} int_O^Y f (t) \ cos\ left (\ frac { 2\ Pi .n t}{ t } rigth , DT have simple square wave function. '

' End Sub Sub Macro14() ' ' Macro14 Macro ' - the Fourier transform is used to convert a time domain signal into it frequency domain represent formula : transform \ F (\ omega)(of a continuous signal \ (f(t) , e^{- j \ omega }\ dt] ' "&chr(10)&" ' "&chr(10)&" - where . (f+ \ omega)) = Fourier transform of the ' End Sub Sub Macro15() ' ' Macro15 Macro ' - the la place trans is another transformation used to analyse linear time _ invariant system formula for the la place transform \ F(S)) of function \ (f(t)) is [f(s)=\ into -{O} infty } , f(t) ,, e{-st } St] ' "&chr(10)&" ' "&chr(10)&" - (f(s))= Laplace transfor ' End Sub Sub Macro16() ' ' Macro16 Macro ' |[| dot { x}(t}=Ax(t)+By(t)][y(t)=(x(t)+du(t)] ' "&chr(10)&" ' "&chr(10)&" Where : ' "&chr(10)&" ' "&chr(10)&" -|(x(t))= state vector ' "&chr(10)&" ' "&chr(10)&" .|(u(t))= Input vector ' "&chr(10)&" ' "&chr(10)&" .\ (y(t))= output vector . ' "&chr(10)&" ' "&chr(10)&" .(A)= System . ' "&chr(10)&" ' "&chr(10)&" .(B)= input matrix . ' "&chr(10)&" ' "&chr(10)&" .|(C) = Output matrix . ' "&chr(10)&" ' "&chr(10)&" .(D \ ) ' End Sub Sub Macro17() ' ' Macro17 Macro ' 1. DC machines : speed (n) the speed of DC motor can be calculated using formula [N=\ frac { V-1\ CDOT -R}{ CDOT \ Phi }] ' "&chr(10)&" ' "&chr(10)&" - where \ (N\ ) = speed in Rpm (revolution perminute . ' "&chr(10)&" ' "&chr(10)&" - \ (N)= supply voltage (v) , ' "&chr(10)&" ' "&chr(10)&" -(i)= armature curr ' End Sub Sub Macro18() ' ' Macro18 Macro ' 14*. Mass balance equation : the general mass balance equation can expressed as : ' "&chr(10)&" ' "&chr(10)&" [\ text { input }-\ text { output }+\ { generation } \ text consumption}=\ text { accumulation \ ] ' "&chr(10)&" '

' End Sub Sub Macro19() ' ' Macro19 Macro ' - for a steady state process (where accumulation is zero the equation simplified to [\ text { input}\ text { output}\tezt Generation}-\ text { consumption}=] '

' End Sub Sub Macro20() ' ' Macro20 Macro ' - for a steady state process (where accumulation is zero the equation simplified to [\ text { input}\ text { output}\tezt Generation}-\ text { consumption}=] '

' End Sub Sub Macro21() ' ' Macro21 Macro ' 14.1. master derivatives : electrical derivatives for a simple electrical circuit with an induction ,(L) and a resistor (R/ the voltage across the inductance can be by : \ [V-L {

L\ frac {Dı}{St}] '

' "&chr(10)&"Where (v-L)= voltage accross the inductor. ' End Sub Sub Macro22() ' ' Macro22 Macro ' Eingenvalue analysis for a system represented by a matrix the eingenvalue can indicate stability ,if all aigenvalue have negative real part the involved finding a lyapunov ,(function (V(x)) , such that (V(X)>0) and ,, (\dot{(V)(X)<O) for stabilit ' End Sub Sub Macro23() ' ' Macro23 Macro ' - r esponse request get ,(f" http:// API electricity meter comparable ,/ { meter _ I'd "} return response .jsob ( ) '

' End Sub Sub Macro25() ' ' Macro25 Macro ' _1 force balance the net force acting on the system,express as \F-{\text { net }}=F-{\ text { pneumatic}}++ , ' "&chr(10)&" ' "&chr(10)&" F-{\text { hydraulic }}- , F {\ text { damping }}-F{\ text (inertial }} '

' End Sub Sub Macro26() ' ' Macro26 Macro ' To derive the relationship force ,motion. ,power ,energy . ' "&chr(10)&" ' "&chr(10)&" [F= m\ CDOT a \ ] where. ' "&chr(10)&" ' "&chr(10)&" .(F) = force (N) , | \ (m)= mass (kg) |(a)= acceleration ,(m/s.s) '

' End Sub Sub Macro27() ' ' Macro27 Macro ' Kinetic energy ,(k.E) is the energy of an object du it's motion . ' "&chr(10)&" ' "&chr(10)&" [K.E= \frac {l}{2}.m.V^2.. ' "&chr(10)&" '

' End Sub Sub Macro28() ' ' Macro28 Macro ' Example: Grades: [70,75,80,85,90][70, 75, 80, 85, 90], N=5N = 5: ' "&chr(10)&" 1. Mean: ' "&chr(10)&" ' "&chr(10)&" μ=70+75+80+85+905=80.\mu = \frac{70 + 75 + 80 + 85 + 90}{5} = 80. ' "&chr(10)&" 2. Variance: ' "&chr(10)&" ' "&chr(10)&" s2=(70-80)2+(75-80)2+(80-80)2+(85-80)2+(90-80)25=50.\sigma^2 = \frac{(70-80)^2 + (75-80 ' End Sub Sub Macro29() ' ' Macro29 Macro ' a) Energy in Capacitors '

' "&chr(10)&"Formula: $$ E = \frac{1}{2} C V^2 $$ Where: ' "&chr(10)&"· CC: Capacitance (Farads), ' "&chr(10)&"· VV: Voltage (Volts). '

' "&chr(10)&"Example: For a 10 μF10 , \mu F capacitor with V=240VV = 240V: $$ E = \frac{1}{2} \times 10 \times 10^{-6} \times 240^2 = 0.288 ' End Sub Sub Macro30() ' ' Macro30 Macro ' ' "&chr(10)&" B=?0Tc(t) dt,B = \int_0^T c(t) , dt, ' "&chr(10)&" ' "&chr(10)&" where c(t)c(t): cost rate over time tt. ' "&chr(10)&" ' "&chr(10)&" Example: For c(t)=200-20tc(t) = 200 - 20t over [0,5][0, 5]: ' "&chr(10)&" 1. Compute: ' "&chr(10)&" ' "&chr(10)&" [B = \int_0^5 (200 - 20t) , dt = \left[200t - 10t2\right]*05.]* ' *"&chr(10)&" 2. Result:* ' *"&chr(10)&"* ' *End Sub Sub Macro31()* ' ' *Macro31 Macro* ' *For time-dependent power P(t)P(t), energy is: $$ E = \int*{t_1}^{t_2} P(t) , dt
$.IfP(t) = 100sin?(2pt)P(t) = 100\sin(2\pi t), calculateenergyovert = 0t = 0tot = 1st = 1s:$ E = \int_0^1 100 \sin(2\pi t) , dt = \left[-\frac{100}{2\pi} \cos(2\pi t)
' End Sub

frm13 - 1 Private Sub CommandButton1_Click() End Sub Private Sub Label1_Click() End Sub Private Sub Label12_Click() End Sub Private Sub Label13_Click() End Sub Private Sub Label3_Click() End Sub Private Sub Label4_Click() End Sub Private Sub Label5_Click() End Sub Private Sub Label7_Click() End Sub Private Sub Label8_Click() End Sub Private Sub Label9_Click() End Sub Private Sub ListBox1_Click() End Sub Private Sub ListBox2_Click() End Sub Private Sub MultiPage1_Change() End Sub Private Sub ScrollBar1_Change() End Sub Private Sub TextBox1_Change() End Sub Private Sub TextBox10_Change() End Sub Private Sub TextBox12_Change() End Sub Private Sub TextBox2_Change() End Sub Private Sub TextBox3_Change()frm13 - 2 End Sub Private Sub TextBox4_Change() End Sub Private Sub TextBox6_Change() End Sub Private Sub TextBox8_Change() End Sub Private Sub TextBox9_Change() End Sub Private Sub ToggleButton1_AfterUpdate() End Sub Private Sub ToggleButton1_BeforeDragOver(ByVal Cancel As MSForms.ReturnBoolean, ByVal Data As MSForms. DataObject, ByVal X As Single, ByVal Y As Single, ByVal DragState As MSForms.fmDragState, ByVal Effect As MSForms.ReturnEffect, ByVal Shift As Integer) End Sub Private Sub ToggleButton1_BeforeUpdate(ByVal Cancel As MSForms.ReturnBoolean) End Sub Private Sub ToggleButton1_Change() End Sub Private Sub ToggleButton1_Click() End Sub Private Sub ToggleButton1_Enter() End Sub Private Sub ToggleButton1_Error(ByVal Number As Integer, ByVal Description As MSForms.ReturnString, By Val SCode As Long, ByVal Source As String, ByVal HelpFile As String, ByVal HelpContext As Long, ByVal CancelDisplay As MSForms.ReturnBoolean) End Sub Private Sub ToggleButton1_KeyDown(ByVal KeyCode As MSForms.ReturnInteger, ByVal Shift As Integer) End Sub Private

ToggleButton1_KeyDown(ByVal KeyCode As MSForms.ReturnInteger, ByVal Shift As Integer) End Sub Private Sub ToggleButton1_KeyPress(ByVal KeyAscii As MSForms.ReturnInteger) End Sub Private Sub ToggleButton1_KeyUp(ByVal KeyCode As MSForms.ReturnInteger, ByVal Shift As Integer) End Sub Private Sub ToggleButton1_MouseMove(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single , ByVal Y As Single) End Sub Private Sub ToggleButton1_MouseUp(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByVal Y As Single) End Subfrm13 - 3 Private Sub UserForm_Click() End Submulti meter selecter measure control instrument and value amperemeter volt meter watt metter "txt_lbl2 amperemeter" = "10A to50A" txt_lbl3 voltemeter" = "220vto480 v" txt_lbl4 wathmeter" = "50w to5000w" var metter cos meter txt_lbl5 varremeter" = "50vAr to5000var" txt_lbl6 factor meter" = "1to 80 " sin meter kwh metter kvarh meter frequence meter txt_lbl7 factmeter" = "1to60A" txt_lbl8 amperemeter" = "100kw txt_lbl9 vrhemeter" = "10A to50 txt_lbl10amperemeter" = "10A to5 Label11 txt_lbl11 amperemeter" = "10A to Frame1 ok cancell active ("txt_lbl1 amperemeter" = "10A to50A") and (txt_lbl1 voltemeter" = "220vto480 v")and(txt_lbl1 wathmeter" = "50w to5000w")a(txt_lb Tab1 Tab2

Sub Macro1() ' ' Macro1 Macro ' visual basic atm program .sten object by system .event)hand ' "&chr(10)&"public class transaction box ' "&chr(10)&"const service as decimal =6.5 ' "&chr(10)&"const pin as integer +9343 ' "&chr(10)&"dim balance as decimal =150 ' "&chr(10)&"private sub label 12_click (by sender System.object event arg handles labe ' End Sub Sub Macro2() ' ' Macro2 Macro ' type meter three phase ac static watt hous smart ' "&chr(10)&"metering algorith ' "&chr(10)&"accuracy nomial voltage mettering frequence metering const functionality current sensors energy pulse energy temper detection remote communication iec 62056 extrevm internal battery ' ActiveWindow.ActivePane.VerticalPercentScrolled = 205 ActiveWindow.ActivePane.VerticalPercentScrolled = 146 Selection.TypeText Text:= _ "---" Selection.TypeText Text:= _ "---" Selection.TypeText Text:="-------" Selection.TypeParagraph Selection.PasteAndFormat (wdFormatOriginalFormatting) ActiveWindow.ActivePane.VerticalPercentScrolled = 146 Selection.TypeParagraph Selection.Paste ActiveDocument.Save ActiveWindow.ActivePane.VerticalPercentScrolled = 207 ActiveWindow.ActivePane.VerticalPercentScrolled = 202 ActiveWindow.ActivePane.VerticalPercentScrolled = 197 ActiveWindow.ActivePane.LargeScroll Down:=1 ActiveWindow.ActivePane.VerticalPercentScrolled = -75 ActiveWindow.ActivePane.VerticalPercentScrolled = -41 Windows("Doc8 drawing tshingombe fiston").Activate Windows("Doc2 drawing tshingombe").Activate ActiveWindow.ActivePane.VerticalPercentScrolled = 127 ActiveWindow.Close ActiveWindow.Close ActiveWindow.Close ActiveWindow.Close ActiveWindow.Close ChangeFileOpenDirectory "C:\Users\Library SIX\Desktop" ActiveDocument.SaveAs2 FileName:="Doc1 tshing.docx", FileFormat:= _ wdFormatXMLDocument, LockComments:=False, Password:="", AddToRecentFiles _ :=True, WritePassword:="", ReadOnlyRecommended:=False, EmbedTrueTypeFonts _ :=False, SaveNativePictureFormat:=False, SaveFormsData:=False, _ SaveAsAOCELetter:=False, CompatibilityMode:=15 ActiveWindow.Close Application.Quit End Sub Sub Macro3() ' ' Macro3 Macro ' 170.{ " IF (X1=0)+(X2=0)+(X3=0)+(X4=0)+(X5=0)+(X6=0)+(X7=0)+(X8=)THEN "} OR "SUB"" *CLICK"* ' "*&chr(10)&*" *"SELECT REGISTER .ELSE , CPU"=0 , ADRESSPIN = 000000000* ' "&chr(10)&"180 END IF " *IF (S1=0)+(S2=0)+(S3=0)+(S4=0)+(S5=0)+(S6=0)+(S7=0)+(S8=0)THEN "} OR "SUB""* CLICK ' "&chr(10)&"EXECU ' Application.Run MacroName:="frm1" End Sub Sub Macro4() ' ' Macro4 Macro ' 170.{ " IF (X1=0)+(X2=0)+(X3=0)+(X4=0)+(X5=0)+(X6=0)+(X7=0)+(X8=0)THEN "} OR "SUB"" *CLICK"* ' "*&chr(10)&*" *SELECT REGISTER .ELSE , CPU ,* ' "*&chr(10)&*"*180 END IF " IF (S1=1)+(S2=1)+(S3=1)+(S4=1)+(S5=1)+(S6=1)+(S7=1)+(S8=1)THEN "} OR "SUB""* CLICK ' "&chr(10)&"EXECUTION LOOP '

' Application.Run MacroName:="frm1" ActiveWindow.ActivePane.VerticalPercentScrolled = 119 Selection.Copy Application.Run MacroName:="frm1" End Sub Sub Macro5() ' ' Macro5 Macro ' 10.INPUT X1 ' "&chr(10)&"20 INPUT Y2 " "&chr(10)&"30 INPUT Y3 " "&chr(10)&"40 INPUT Y4 " "&chr(10)&"50 INPUT Y5 "

&chr(10)& 20. INPUT .X2 " &chr(10)& 30. INPUT X3 " &chr(10)& 40. INPUT X4 " &chr(10)& 50,IN[UT X5 "&chr(10)&"60. INPUT X6 ' "&chr(10)&"60.INPUT .X7. '

' "&chr(10)&" 70.OUTPUT S1 ' "&chr(10)&"80.OUTPUT.S2 ' "&chr(10)&"90,OUTPUT S3 ' "&chr(10)&"100.OUTPUT S4 ' "&chr(10)&"110.OUTPUT S5 ' "&chr(10)&"120 OUTPUT S6 ' "&chr(10)&"130.OUTPUT S7 ' "&chr(10)&"140.OUTPUT ' "&chr(10)&"150 SELECT REGISTER ' "&chr(10)&"150 OUTPUT HARDW ' Application.Run MacroName:="frm1" End Sub Sub frm1() ' ' frm1 Macro ' '

End Sub Sub Macro24() ' ' Macro24 Macro ' ' "&chr(10)&" (f(x,y)) the partial derivatives with respect to (x) ' "&chr(10)&" ' "&chr(10)&" Is denoted as (\ frac{\ partial f }{ partial x}) and with , ' "&chr(10)&" ' "&chr(10)&" Respect to \ (y) as (\ frac {\ partial f }{\ partial ,y }) ' "&chr(10)&" ' "&chr(10)&" Examp : [funct [f(x,y)=x^2y+3xy^3] ' "&chr(10)&" ' "&chr(10)&" * Calcu ' End Sub Sub Macro6() ' ' Macro6 Macro ' ' "&chr(10)&" (f(x,y)) the partial derivatives with respect to (x) ' "&chr(10)&" ' "&chr(10)&" Is denoted as (\ frac{\ partial f }{ partial x}) and with , ' "&chr(10)&" ' "&chr(10)&" Respect to \ (y) as (\ frac {\ partial f }{\ partial ,y }) ' "&chr(10)&" ' "&chr(10)&" Examp : [funct [f(x,y)=x^2y+3xy^3] ' "&chr(10)&" ' "&chr(10)&" * Calcu ' End Sub Sub Macro7() ' ' Macro7 Macro ' ' "&chr(10)&" (f(x,y)), the total derivatives \ (DF) is given by : [DF = \ frac { \ partial f }{\ partial x }sx +\ frac{ \ partial }{ \ partial y } St \ ] ' "&chr(10)&" ' "&chr(10)&" Using the previous : \ [DF = 2xy+ 2y^2) ' "&chr(10)&" '

' End Sub Sub Macro8() ' ' Macro8 Macro ' 1. Fourier series : the Fourier series and cosine function for periodic function \ (ft)) with period (t) the Fourier series is. ' "&chr(10)&" ' "&chr(10)&" f(t)= a 0+\ sum ${n= 1}{\ infty} ' "&chr(10)&" ' "&chr(10)&" \ left + a_ n \ cos \ left \ left + } frac { 2\ pi not }{T} ' "&chr(10)&" ' "&chr(10)&" \ right) + b _ ' End Sub Sub Macro9() ' ' Macro9 Macro ' ' "&chr(10)&" .[R-{\ text t{ total }}= R1+R2+R3] ' "&chr(10)&" ' "&chr(10)&" . Substituting the values [R - { \ text { total }}= 10.\ text , { ohms }+ 20, text{ ohms}+30, text {ohms}], calculating ,[R - { \ text { total /}} = 60\ text { ohm }] '

' End Sub Sub Macro10() ' ' Macro10 Macro ' 0 ' "&chr(10)&" [Z =\ sqrt{R^ 2+(x-L-X_C)^2}] ' "&chr(10)&" ' "&chr(10)&" Where _(x_L= 2\ pi f L \ Pi .f.c} (capacitive reactance , ' "&chr(10)&" ' "&chr(10)&" -(X_C)=\ frac , {1}{2\ pi.f.c}}(capacitive reactance. ' "&chr(10)&" ' "&chr(10)&" -|(fl) is the frequency in Hertz (z) ' "&chr(10)&" ' "&chr(10)&" -(L/) is the inductance in Hertz (Hz) ' End Sub Sub Macro11() ' ' Macro11 Macro ' The power factor ,of is defined as the ratio of real power to apparent power , \ [\ text power factor ,of)}=\ frac ,{P}{s}] ' "&chr(10)&" ' "&chr(10)&" Where : .(P)= real power (w) ' "&chr(10)&" ' "&chr(10)&" .(S\)= apparent power ,(VA) '

' End Sub Sub Macro12() ' ' Macro12 Macro ' [S=\sqt{P^2+Q^2}] ' "&chr(10)&" ' "&chr(10)&" .value .real power ((P))=500w, ' "&chr(10)&" ' "&chr(10)&" .reactive power(\Q))=300VAR ' "&chr(10)&" ' "&chr(10)&" - calculate apparent power (s)[,S=\sqt{P^2t '

' End Sub Sub Macro13() ' ' Macro13 Macro ' ' "&chr(10)&" -where . ' "&chr(10)&" ' "&chr(10)&" |(a-O=| frac {1}{T} int- 0^ f(t)\dt) ' "&chr(10)&" ' "&chr(10)&" .+a-n = frac {2}{T} int_O^Y f (t) \ cos\ left (\ frac { 2\ Pi .n t}{ t } rigth , DT have simple square wave function. '

' End Sub Sub Macro14() ' ' Macro14 Macro ' - the Fourier transform is used to convert a time domain signal into it frequency domain represent formula : transform \ F (\ omega)(of a continuous signal \ (f(t) , e^{- j \ omega }\ dt] ' "&chr(10)&" ' "&chr(10)&" - where . (f+ \ omega)) = Fourier transform of the ' End Sub Sub Macro15() ' ' Macro15 Macro ' - the la place trans is another transformation used to analyse linear time _ invariant system formula for the la place transform \ F(S)) of function \ (f(t)) is [f(s)=\ into -{O} infty } , f(t) ,, e{-st } St] ' "&chr(10)&" ' "&chr(10)&" - (f(s))= Laplace transfor ' End Sub Sub Macro16() ' ' Macro16 Macro ' |[| dot { x}(t}=Ax(t)+By(t)][y(t)=(x(t)+du(t)] ' "&chr(10)&" ' "&chr(10)&" Where : ' "&chr(10)&" ' "&chr(10)&" -|(x(t))= state vector ' "&chr(10)&" ' "&chr(10)&" .|(u(t))= Input vector ' "&chr(10)&" ' "&chr(10)&" .\ (y(t))= output vector . ' "&chr(10)&" ' "&chr(10)&" .(A)= System . ' "&chr(10)&" ' "&chr(10)&" .(B)= input matrix . ' "&chr(10)&" ' "&chr(10)&" .|(C) = Output matrix . ' "&chr(10)&" ' "&chr(10)&" .(D \ ) ' End Sub Sub Macro17() ' ' Macro17 Macro ' 1. DC machines : speed (n) the speed of DC motor can be calculated using formula [N=\ frac { V-1\ CDOT -R}{ CDOT \ Phi }] ' "&chr(10)&" ' "&chr(10)&" - where \ (N\ ) = speed in Rpm (revolution perminute . ' "&chr(10)&" ' "&chr(10)&" - \ (N)= supply voltage (v) , ' "&chr(10)&" ' "&chr(10)&" -(i)= armature curr ' End Sub Sub Macro18() ' ' Macro18 Macro ' 14*. Mass balance equation : the general mass

balance equation can expressed as : ' "&chr(10)&" ' "&chr(10)&" [\ text { input }-\ text { output }+\ { generation } \ text consumption}=\ text { accumulation \ ] ' "&chr(10)&" '

' End Sub Sub Macro19() ' ' Macro19 Macro ' - for a steady state process (where accumulation is zero the equation simplified to [\ text { input}\ text { output}\tezt Generation}-\ text { consumption}=] '

' End Sub Sub Macro20() ' ' Macro20 Macro ' - for a steady state process (where accumulation is zero the equation simplified to [\ text { input}\ text { output}\tezt Generation}-\ text { consumption}=] '

' End Sub Sub Macro21() ' ' Macro21 Macro ' 14.1. master derivatives : electrical derivatives for a simple electrical circuit with an induction ,(L) and a resistor (R/ the voltage across the inductance can be by : \ [V-L { L\ frac {Di}{St}] '

' "&chr(10)&"Where (v-L)= voltage accross the inductor. ' End Sub Sub Macro22() ' ' Macro22 Macro ' Eingenvalue analysis for a system represented by a matrix the eingenvalue can indicate stability ,if all aigenvalue have negative real part the involved finding a lyapunov ,(function (V(x)) , such that (V(X)>0) and ,, (\dot{(V)(X)<O) for stabilit ' End Sub Sub Macro23() ' ' Macro23 Macro ' - r esponse request get ,(f" http:// API electricity meter comparable ,/ { meter _ I'd "} return response .jsob ( ) '

' End Sub Sub Macro25() ' ' Macro25 Macro ' _1 force balance the net force acting on the system,express as \F-{\text { net }}=F-{\ text { pneumatic}}++ , ' "&chr(10)&" ' "&chr(10)&" F-{\text { hydraulic }}- , F {\ text { damping }}-F{\ text (inertial }} '

' End Sub Sub Macro26() ' ' Macro26 Macro ' To derive the relationship force ,motion. ,power ,energy . ' "&chr(10)&" ' "&chr(10)&" [F= m\ CDOT a \ ] where. ' "&chr(10)&" ' "&chr(10)&" .(F) = force (N) , | \ (m)= mass (kg) |(a)= acceleration ,(m/s.s) '

' End Sub Sub Macro27() ' ' Macro27 Macro ' Kinetic energy ,(k.E) is the energy of an object du it's motion . ' "&chr(10)&" ' "&chr(10)&" [K.E= \frac {I}{2}.m.V^2.. ' "&chr(10)&" '

' End Sub Sub Macro28() ' ' Macro28 Macro ' Example: Grades: [70,75,80,85,90][70, 75, 80, 85, 90], N=5N = 5: ' "&chr(10)&" 1. Mean: ' "&chr(10)&" ' "&chr(10)&" μ=70+75+80+85+905=80.\mu = \frac{70 + 75 + 80 + 85 + 90}{5} = 80. ' "&chr(10)&" 2. Variance: ' "&chr(10)&" ' "&chr(10)&" s2=(70-80)2+(75-80)2+(80-80)2+(85-80)2+(90-80)25=50.\sigma^2 = \frac{(70-80)^2 + (75-80 ' End Sub Sub Macro29() ' ' Macro29 Macro ' a) Energy in Capacitors '

' "&chr(10)&"Formula: $$ E = \frac{1}{2} C V^2 $$ Where: ' "&chr(10)&"· CC: Capacitance (Farads), ' "&chr(10)&"· VV: Voltage (Volts). '

' "&chr(10)&"Example: For a 10 μF10 , \mu F capacitor with V=240VV = 240V: $$ E = \frac{1}{2} \times 10 \times 10^{-6} \times 240^2 = 0.288 ' End Sub Sub Macro30() ' ' Macro30 Macro ' ' "&chr(10)&" B=?0Tc(t) dt,B = \int_0^T c(t) , dt, ' "&chr(10)&" ' "&chr(10)&" where c(t)c(t): cost rate over time tt. ' "&chr(10)&" ' "&chr(10)&" Example: For c(t)=200-20tc(t) = 200 - 20t over [0,5][0, 5]: ' "&chr(10)&" 1. Compute: ' "&chr(10)&" ' "&chr(10)&" [B = \int_0^5 (200 - 20t) , dt = \left[200t - 10t2\right]*05.]* ' *"&chr(10)&" 2. Result:* ' *"&chr(10)&"* ' *End Sub Sub Macro31()* ' ' *Macro31 Macro* ' *For time-dependent power P(t)P(t), energy is: $$ E = \int*{t_1}^{t_2} P(t) , dt
$.IfP(t) = 100sin?(2pt)P(t) = 100\sin(2\pi t), calculateenergyovert = 0t = 0tot = 1st = 1s:$ E = \int_0^1 100 \sin(2\pi t) , dt = \left[-\frac{100}{2\pi} \cos(2\pi t)
' End Sub

VERSION 5.00 Begin {C62A69F0-16DC-11CE-9E98-00AA00574A4F} UserForm12 Caption = "UserForm12" ClientHeight = 8736 ClientLeft = 108 ClientTop = 456 ClientWidth = 19764 OleObjectBlob = "UserForm computer x 1 tshingombe.frx":0000 StartUpPosition = 1 'CenterOwner WhatsThisButton = -1 'True WhatsThisHelp = -1 'True End Attribute VB_Name = "UserForm12" Attribute VB_GlobalNameSpace = False Attribute VB_Creatable = False Attribute VB_PredeclaredId = True Attribute VB_Exposed = False VERSION 5.00 Begin {C62A69F0-16DC-11CE-9E98-00AA00574A4F} UserForm12 Caption = "UserForm12" ClientHeight = 9132 ClientLeft = 108 ClientTop = 456 ClientWidth = 20004 OleObjectBlob = "UserForm1 tshingombe

student registration excll vb macro.frx 23.frx COMPUTER X MACRO 14.frx":0000 StartUpPosition = 1 'CenterOwner End Attribute VB_Name = "UserForm12" Attribute VB_GlobalNameSpace = False Attribute VB_Creatable = False Attribute VB_PredeclaredId = True Attribute VB_Exposed = False Private Sub Label5_Click()

End Sub

Private Sub Label6_Click()

End Sub

Private Sub CommandButton5_Click()

End Sub

Private Sub CommandButton6_Click()

End Sub

Private Sub CommandButton8_Click()

End Sub

Private Sub CommandButton9_Click()

End Sub

Private Sub Label1_Click()

End Sub

Private Sub Label2_Click()

End Sub

Private Sub Label3_Click()

End Sub

Private Sub Label5_Click()

End Sub

Private Sub ListBox1_Click()

End Sub

Private Sub ScrollBar1_Change()

End Sub

Private Sub UserForm_Activate()

End Sub

Private Sub UserForm_Click()

End Sub VERSION 5.00 Begin {C62A69F0-16DC-11CE-9E98-00AA00574A4F} UserForm9 Caption = "UserForm9" ClientHeight = 8820 ClientLeft = 108 ClientTop = 456 ClientWidth = 19656 OleObjectBlob = "UserForm2tshingombe.metering algo.frx":0000 StartUpPosition = 1 'CenterOwner WhatsThisButton = -1 'True WhatsThisHelp = -1 'True End Attribute VB_Name = "UserForm9" Attribute VB_GlobalNameSpace = False Attribute VB_Creatable = False Attribute VB_PredeclaredId = True Attribute VB_Exposed = False Private Sub Frame3_Click()

Sub Frame3_Click()

End Sub

Private Sub TextBox6_Change()

End Sub VERSION 5.00 Begin {C62A69F0-16DC-11CE-9E98-00AA00574A4F} UserForm1 Caption = "UserForm1" ClientHeight = 9024 ClientLeft = 108 ClientTop = 456 ClientWidth = 19812 OleObjectBlob = "EXCELL UserForm1TSHIN.frm FORM.pdf MATERIAL INSTALLER.pdf 2 CALCULAR HARDWARE.pdf, POWER ...frx":0000 StartUpPosition = 3 'Windows Default WhatsThisButton = -1 'True WhatsThisHelp = -1 'True End Attribute VB_Name = "UserForm1" Attribute VB_GlobalNameSpace = False Attribute VB_Creatable = False Attribute VB_PredeclaredId = True Attribute VB_Exposed = False VERSION 5.00 Begin {C62A69F0-16DC-11CE-9E98-00AA00574A4F} UserForm3 Caption = "UserForm3" ClientHeight = 8868 ClientLeft = 108 ClientTop = 456 ClientWidth = 19944 OleObjectBlob = "FORM TSHINGOMBE..TSHI PLC.frm 2.frx":0000 StartUpPosition = 1 'CenterOwner WhatsThisButton = -1 'True WhatsThisHelp = -1 'True End Attribute VB_Name = "UserForm3" Attribute VB_GlobalNameSpace = False Attribute VB_Creatable = False Attribute VB_PredeclaredId = True Attribute VB_Exposed = False Private Sub Label4_Click()

End Sub

Private Sub Label5_Click()

End Sub

Private Sub TextBox1_Change()

End Sub

Private Sub UserForm_Click()

End Sub VERSION 5.00 Begin {C62A69F0-16DC-11CE-9E98-00AA00574A4F} UserForm2 Caption = "UserForm2" ClientHeight = 8640 ClientLeft = 108 ClientTop = 456 ClientWidth = 19632 OleObjectBlob = "EXCELL UserForm1TSHIN.frm FORM.pdf MATERIAL INSTALLER.pdf 2 CALCULAR excell , vb.frx":0000 WhatsThisButton = -1 'True WhatsThisHelp = -1 'True End Attribute VB_Name = "UserForm2" Attribute VB_GlobalNameSpace = False Attribute VB_Creatable = False Attribute VB_PredeclaredId = True Attribute VB_Exposed = False Private Sub CommandButton13_Click()

End Sub

Private Sub CommandButton17_Click()

End Sub

Private Sub CommandButton3_Click()

End Sub

Private Sub CommandButton7_Click()

End Sub

Private Sub Label1_Click()

End Sub

Private Sub TextBox1_Change()

End Sub

Private Sub TextBox1_DblClick(ByVal Cancel As MSForms.ReturnBoolean)

End Sub VERSION 5.00 Begin {C62A69F0-16DC-11CE-9E98-00AA00574A4F} UserForm3 Caption =

End Sub VERSION 5.00 Begin {C62A69F0-16DC-11CE-9E98-00AA00574A4F} UserForm3 Caption = "UserForm3" ClientHeight = 8868 ClientLeft = 108 ClientTop = 456 ClientWidth = 19944 OleObjectBlob = "FORM TSHINGOMBE..TSHI PLC.frm 2.frx":0000 StartUpPosition = 1 'CenterOwner WhatsThisButton = -1 'True WhatsThisHelp = -1 'True End Attribute VB_Name = "UserForm3" Attribute VB_GlobalNameSpace = False Attribute VB_Creatable = False Attribute VB_PredeclaredId = True Attribute VB_Exposed = False Private Sub Label4_Click()

End Sub

Private Sub Label5_Click()

End Sub

Private Sub TextBox1_Change()

End Sub

Private Sub UserForm_Click()

End Sub VERSION 5.00 Begin {C62A69F0-16DC-11CE-9E98-00AA00574A4F} UserForm2 Caption = "UserForm2" ClientHeight = 8640 ClientLeft = 108 ClientTop = 456 ClientWidth = 19632 OleObjectBlob = "EXCELL UserForm1TSHIN.frm FORM.pdf MATERIAL INSTALLER.pdf 2 CALCULAR excell , vb.frx":0000 WhatsThisButton = -1 'True WhatsThisHelp = -1 'True End Attribute VB_Name = "UserForm2" Attribute VB_GlobalNameSpace = False Attribute VB_Creatable = False Attribute VB_PredeclaredId = True Attribute VB_Exposed = False Private Sub CommandButton13_Click()

End Sub

Private Sub CommandButton17_Click()

End Sub

Private Sub CommandButton3_Click()

End Sub

Private Sub CommandButton7_Click()

End Sub

Private Sub Label1_Click()

End Sub

Private Sub TextBox1_Change()

End Sub

Private Sub TextBox1_DblClick(ByVal Cancel As MSForms.ReturnBoolean)

End Sub VERSION 5.00 Begin {C62A69F0-16DC-11CE-9E98-00AA00574A4F} UserForm1 Caption = "UserForm1" ClientHeight = 9300 ClientLeft = 108 ClientTop = 456 ClientWidth = 19992 OleObjectBlob = "UserForm1 tshingombe student registration excll vb macro.frx 23.frx":0000 StartUpPosition = 1 'CenterOwner WhatsThisButton = -1 'True WhatsThisHelp = -1 'True End Attribute VB_Name = "UserForm1" Attribute VB_GlobalNameSpace = False Attribute VB_Creatable = False Attribute VB_PredeclaredId = True Attribute VB_Exposed = False Private Sub Label9_Click()

End Sub

Private Sub OptionButton1_Click()

End Sub

End Sub

Private Sub OptionButton2_Click()

End Sub

Private Sub TextBox1_Change()

End Sub

Private Sub TextBox2_Change()

End Sub

Private Sub TextBox3_Change()

End Sub

Private Sub TextBox4_Change()

End Sub

Private Sub TextBox6_Change()

End Sub

Private Sub TextBox7_Change()

End Sub

Private Sub TextBox8_Change()

End Sub

Private Sub UserForm_Click()

End Sub

Private Sub UserForm_DblClick(ByVal Cancel As MSForms.ReturnBoolean)

End Sub

Private Sub UserForm_Initialize()

End Sub VERSION 5.00 Begin {C62A69F0-16DC-11CE-9E98-00AA00574A4F} UserForm8 Caption = "UserForm8" ClientHeight = 9204 ClientLeft = 108 ClientTop = 456 ClientWidth = 19908 OleObjectBlob = "UserForm2tshingombe.account teller student.frx":0000 StartUpPosition = 1 'CenterOwner WhatsThisButton = -1 'True WhatsThisHelp = -1 'True End Attribute VB_Name = "UserForm8" Attribute VB_GlobalNameSpace = False Attribute VB_Creatable = False Attribute VB_PredeclaredId = True Attribute VB_Exposed = False Private Sub Frame1_Click()

End Sub

Private Sub Frame3_Click()

End Sub

Private Sub Frame5_Click()

End Sub

Private Sub Label13_Click()

End Sub

End Sub

Private Sub Label14_Click()

End Sub

Private Sub Label5_Click()

End Sub

Private Sub TextBox11_Change()

End Sub Begin {C62A69F0-16DC-11CE-9E98-00AA00574A4F} UserForm2 Caption = "UserForm2" ClientHeight = 7236 ClientLeft = 108 ClientTop = 456 ClientWidth = 17748 OleObjectBlob = "TSHINGOMBE EXCELLL CALCULATOR,, UserForm2.frx":0000 StartUpPosition = 1 'CenterOwner End Attribute VB_Name = "UserForm2" Attribute VB_GlobalNameSpace = False Attribute VB_Creatable = False Attribute VB_PredeclaredId = True Attribute VB_Exposed = False Private Sub CommandButton69_Click()

End Sub

Private Sub CommandButton7_Click()

End Sub

Private Sub CommandButton70_Click()

End Sub

Private Sub CommandButton8_Click()

End Sub

Private Sub CommandButton9_Click()

End Sub

Private Sub Frame1_Click()

End Sub

Private Sub Frame2_Click()

End Sub

Private Sub Frame3_Click()

End Sub

Private Sub Label1_Click()

End Sub

Private Sub TextBox1_Change()

End Sub

Private Sub TextBox2_Change()

End Sub

Private Sub UserForm_Click()

End Sub VERSION 5.00 Begin {C62A69F0-16DC-11CE-9E98-00AA00574A4F} UserForm1 Caption = "UserForm1" ClientHeight = 9396 ClientLeft = 108 ClientTop = 456 ClientWidth = 19560 OleObjectBlob =

"FORM TSHINGOMBE..TSHI PLC.frx":0000 StartUpPosition = 1 'CenterOwner End Attribute VB_Name = "UserForm1" Attribute VB_GlobalNameSpace = False Attribute VB_Creatable = False Attribute VB_PredeclaredId = True Attribute VB_Exposed = False Sub Macro1() ' ' Macro1 Macro ' visual basic atm program .sten object by system .event)hand ' "&chr(10)&"public class transaction box ' "&chr(10)&"const service as decimal =6.5 ' "&chr(10)&"const pin as integer +9343 ' "&chr(10)&"dim balance as decimal =150 ' "&chr(10)&"private sub label 12_click (by sender System.object event arg handles labe ' End Sub Sub Macro2() ' ' Macro2 Macro ' type meter three phase ac static watt hous smart ' "&chr(10)&"metering algorith ' "&chr(10)&"accuracy nomial voltage mettering frequence metering const functionality current sensors energy pulse energy temper detection remote communication iec 62056 extrevm internal battery ' ActiveWindow.ActivePane.VerticalPercentScrolled = 205 ActiveWindow.ActivePane.VerticalPercentScrolled = 146 Selection.TypeText Text:= _ "----------" Selection.TypeText Text:= _ "----------" Selection.TypeText Text:="-------" Selection.TypeParagraph Selection.PasteAndFormat (wdFormatOriginalFormatting) ActiveWindow.ActivePane.VerticalPercentScrolled = 146 Selection.TypeParagraph Selection.Paste ActiveDocument.Save ActiveWindow.ActivePane.VerticalPercentScrolled = 207 ActiveWindow.ActivePane.VerticalPercentScrolled = 202 ActiveWindow.ActivePane.VerticalPercentScrolled = 197 ActiveWindow.ActivePane.LargeScroll Down:=1 ActiveWindow.ActivePane.VerticalPercentScrolled = -75 ActiveWindow.ActivePane.VerticalPercentScrolled = -41 Windows("Doc8 drawing tshingombe fiston").Activate Windows("Doc2 drawing tshingombe").Activate ActiveWindow.ActivePane.VerticalPercentScrolled = 127 ActiveWindow.Close ActiveWindow.Close ActiveWindow.Close ActiveWindow.Close ActiveWindow.Close ChangeFileOpenDirectory "C:\Users\Library SIX\Desktop" ActiveDocument.SaveAs2 FileName:="Doc1 tshing.docx", FileFormat:= _ wdFormatXMLDocument, LockComments:=False, Password:="", AddToRecentFiles _ :=True, WritePassword:="", ReadOnlyRecommended:=False, EmbedTrueTypeFonts _ :=False, SaveNativePictureFormat:=False, SaveFormsData:=False, _ SaveAsAOCELetter:=False, CompatibilityMode:=15 ActiveWindow.Close Application.Quit End Sub Sub Macro3() ' ' Macro3 Macro ' 170.{ " IF (X1=0)+(X2=0)+(X3=0)+(X4=0)+(X5=0)+(X6=0)+(X7=0)+(X8=)THEN "} OR "SUB"" *CLICK"* ' *"&chr(10)&" "SELECT REGISTER .ELSE , CPU"=0 , ADRESSPIN = 000000000* ' *"&chr(10)&"180 END IF " IF (S1=0)+(S2=0)+(S3=0)+(S4=0)+(S5=0)+(S6=0)+(S7=0)+(S8=0)THEN "} OR "SUB"" CLICK ' "&chr(10)&"EXECU ' Application.Run MacroName:="frm1" End Sub Sub Macro4() ' ' Macro4 Macro ' 170.{ " IF (X1=0)+(X2=0)+(X3=0)+(X4=0)+(X5=0)+(X6=0)+(X7=0)+(X8=0)THEN "} OR "SUB"" *CLICK"* ' *"&chr(10)&" SELECT REGISTER .ELSE , CPU , ' "&chr(10)&"180 END IF " IF (S1=1)+(S2=1)+(S3=1)+(S4=1)+(S5=1)+(S6=1)+(S7=1)+(S8=1)THEN "} OR "SUB"" CLICK ' "&chr(10)&"EXECUTION LOOP '

' Application.Run MacroName:="frm1" ActiveWindow.ActivePane.VerticalPercentScrolled = 119 Selection.Copy Application.Run MacroName:="frm1" End Sub Sub Macro5() ' ' Macro5 Macro ' 10.INPUT X1 ' "&chr(10)&"20. INPUT .X2 ' "&chr(10)&"30. INPUT X3 ' "&chr(10)&"40. INPUT X4 ' "&chr(10)&"50,IN[UT X5 ' "&chr(10)&"60. INPUT X6 ' "&chr(10)&"60.INPUT .X7. '

' "&chr(10)&" 70.OUTPUT S1 ' "&chr(10)&"80.OUTPUT.S2 ' "&chr(10)&"90,OUTPUT S3 ' "&chr(10)&"100.OUTPUT S4 ' "&chr(10)&"110.OUTPUT S5 ' "&chr(10)&"120 OUTPUT S6 ' "&chr(10)&"130.OUTPUT S7 ' "&chr(10)&"140.OUTPUT ' "&chr(10)&"150 SELECT REGISTER ' "&chr(10)&"150 OUTPUT HARDW ' Application.Run MacroName:="frm1" End Sub Sub frm1() ' ' frm1 Macro ' '

End Sub Sub Macro24() ' ' Macro24 Macro ' ' "&chr(10)&" (f(x,y)) the partial derivatives with respect to (x) ' "&chr(10)&" ' "&chr(10)&" Is denoted as (\ frac{\ partial f }{ partial x}) and with , ' "&chr(10)&" ' "&chr(10)&" Respect to \ (y) as (\ frac {\ partial f }{\ partial ,y }) ' "&chr(10)&" ' "&chr(10)&" Examp : [funct [f(x,y)=x^2y+3xy^3] ' "&chr(10)&" ' "&chr(10)&" * Calcu ' End Sub Sub Macro6() ' ' Macro6 Macro ' '

"&chr(10)&" (f(x,y)) the partial derivatives with respect to (x) ' "&chr(10)&" ' "&chr(10)&" Is denoted as (\ frac{\ partial f }{ partial x}) and with , ' "&chr(10)&" ' "&chr(10)&" Respect to \ (y) as (\ frac {\ partial f }{\ partial ,y }) ' "&chr(10)&" ' "&chr(10)&" Examp : [funct [f(x,y)=x^2y+3xy^3] ' "&chr(10)&" ' "&chr(10)&" * Calcu ' End Sub Sub Macro7() ' ' Macro7 Macro ' ' "&chr(10)&" (f(x,y)), the total derivatives \ (DF) is given by : [DF = \ frac { \ partial f }{\ partial x }sx +\ frac{ \ partial }{ \ partial y } St \ ] ' "&chr(10)&" ' "&chr(10)&" Using the previous : \ [DF = 2xy+ 2y^2) ' "&chr(10)&" '

' End Sub Sub Macro8() ' ' Macro8 Macro ' 1. Fourier series : the Fourier series and cosine function for periodic function \ (ft)) with period (t) the Fourier series is. ' "&chr(10)&" ' "&chr(10)&" f(t)= a 0+\ sum ${n= 1}{\ infty} ' "&chr(10)&" ' "&chr(10)&" \ left + a_ n \ cos \ left \ left + } frac { 2\ pi not }{T} ' "&chr(10)&" ' "&chr(10)&" \ right) + b _ ' End Sub Sub Macro9() ' ' Macro9 Macro ' ' "&chr(10)&" .[R-{\ text t{ total }}= R1+R2+R3] ' "&chr(10)&" ' "&chr(10)&" . Substituting the values [R - { \ text { total }}= 10.\ text , { ohms }+ 20, text{ ohms}+30, text {ohms}], calculating ,[R - { \ text { total /}} = 60\ text { ohm }] '

' End Sub Sub Macro10() ' ' Macro10 Macro ' 0 ' "&chr(10)&" [Z =\ sqrt{R^ 2+(x-L-X_C)^2}] ' "&chr(10)&" ' "&chr(10)&" Where _(x_L= 2\ pi f L \ Pi .f.c} (capacitive reactance , ' "&chr(10)&" ' "&chr(10)&" -(X_C)=\ frac , {1}{2\ pi.f.c}}(capacitive reactance. ' "&chr(10)&" ' "&chr(10)&" -|(fl) is the frequency in Hertz (z) ' "&chr(10)&" ' "&chr(10)&" -(L/) is the inductance in Hertz (Hz) ' End Sub Sub Macro11() ' ' Macro11 Macro ' The power factor ,of is defined as the ratio of real power to apparent power , \ [\ text power factor ,of)}=\ frac ,{P}{s}] ' "&chr(10)&" ' "&chr(10)&" Where : .(P)= real power (w) ' "&chr(10)&" ' "&chr(10)&" .(S\)= apparent power ,(VA) '

' End Sub Sub Macro12() ' ' Macro12 Macro ' [S=\sqt{P^2+Q^2}] ' "&chr(10)&" ' "&chr(10)&" .value .real power ((P))=500w, ' "&chr(10)&" ' "&chr(10)&" .reactive power(\Q))=300VAR ' "&chr(10)&" ' "&chr(10)&" - calculate apparent power (s)[,S=\sqt{P^2t '

' End Sub Sub Macro13() ' ' Macro13 Macro ' ' "&chr(10)&" -where . ' "&chr(10)&" ' "&chr(10)&" |(a-O=| frac {1}{T} int- 0^ f(t)\dt) ' "&chr(10)&" ' "&chr(10)&" .+a-n = frac {2}{T} int_O^Y f (t) \ cos\ left (\ frac { 2\ Pi .n t}{ t } rigth , DT have simple square wave function. '

' End Sub Sub Macro14() ' ' Macro14 Macro ' - the Fourier transform is used to convert a time domain signal into it frequency domain represent formula : transform \ F (\ omega)(of a continuous signal \ (f(t) , e^{- j \ omega }\ dt] ' "&chr(10)&" ' "&chr(10)&" - where . (f+ \ omega)) = Fourier transform of the ' End Sub Sub Macro15() ' ' Macro15 Macro ' - the la place trans is another transformation used to analyse linear time _ invariant system formula for the la place transform \ F(S)) of function \ (f(t)) is [f(s)=\ into -{O} infty } , f(t) ,, e{-st } St] ' "&chr(10)&" ' "&chr(10)&" - (f(s))= Laplace transfor ' End Sub Sub Macro16() ' ' Macro16 Macro ' |[| dot { x}(t}=Ax(t)+By(t)][y(t)=(x(t)+du(t)] ' "&chr(10)&" ' "&chr(10)&" Where : ' "&chr(10)&" ' "&chr(10)&" -|(x(t))= state vector ' "&chr(10)&" ' "&chr(10)&" .|(u(t))= Input vector ' "&chr(10)&" ' "&chr(10)&" .\ (y(t))= output vector . ' "&chr(10)&" ' "&chr(10)&" .(A)= System . ' "&chr(10)&" ' "&chr(10)&" .(B)= input matrix . ' "&chr(10)&" ' "&chr(10)&" .|(C) = Output matrix . ' "&chr(10)&" ' "&chr(10)&" .(D \ ) ' End Sub Sub Macro17() ' ' Macro17 Macro ' 1. DC machines : speed (n) the speed of DC motor can be calculated using formula [N=\ frac { V-1\ CDOT -R}{ CDOT \ Phi }] ' "&chr(10)&" ' "&chr(10)&" - where \ (N\ ) = speed in Rpm (revolution perminute . ' "&chr(10)&" ' "&chr(10)&" - \ (N)= supply voltage (v) , ' "&chr(10)&" ' "&chr(10)&" -(i)= armature curr ' End Sub Sub Macro18() ' ' Macro18 Macro ' 14*. Mass balance equation : the general mass balance equation can expressed as : ' "&chr(10)&" ' "&chr(10)&" [\ text { input }-\ text { output }+\ { generation } \ text consumption}=\ text { accumulation \ ] ' "&chr(10)&" '

' End Sub Sub Macro19() ' ' Macro19 Macro ' - for a steady state process (where accumulation is zero the equation simplified to [\ text { input}\ text { output}\tezt Generation}-\ text { consumption}=] '

' End Sub Sub Macro20() ' ' Macro20 Macro ' - for a steady state process (where accumulation is zero the equation simplified to [\ text { input}\ text { output}\tezt Generation}-\ text { consumption}=] '

' End Sub Sub Macro21() ' ' Macro21 Macro ' 14.1. master derivatives : electrical derivatives for a simple electrical circuit with an induction ,(L) and a resistor (R/ the voltage across the inductance can be by : \ [V-L { L\ frac {Di}{St}] '

' "&chr(10)&"Where (v-L)= voltage accross the inductor. ' End Sub Sub Macro22() ' ' Macro22 Macro ' Eingenvalue analysis for a system represented by a matrix the eingenvalue can indicate stability ,if all aigenvalue have negative real part the involved finding a lyapunov ,(function (V(x)) , such that (V(X)>0) and ,, (\dot{(V)(X)<O) for stabilit ' End Sub Sub Macro23() ' ' Macro23 Macro ' - r esponse request get ,(f" http:// API electricity meter comparable ,/ { meter _ I'd "} return response .jsob ( ) '

' End Sub Sub Macro25() ' ' Macro25 Macro ' _1 force balance the net force acting on the system,express as \F-{\text { net }}=F-{\ text { pneumatic}}++ , ' "&chr(10)&" ' "&chr(10)&" F-{\text { hydraulic }}- , F {\ text { damping }}-F{\ text (inertial }} '

' End Sub Sub Macro26() ' ' Macro26 Macro ' To derive the relationship force ,motion. ,power ,energy . ' "&chr(10)&" ' "&chr(10)&" [F= m\ CDOT a \ ] where. ' "&chr(10)&" ' "&chr(10)&" .(F) = force (N) , | \ (m)= mass (kg) |(a)= acceleration ,(m/s.s) '

' End Sub Sub Macro27() ' ' Macro27 Macro ' Kinetic energy ,(k.E) is the energy of an object du it's motion . ' "&chr(10)&" ' "&chr(10)&" [K.E= \frac {I}{2}.m.V^2.. ' "&chr(10)&" '

' End Sub Sub Macro28() ' ' Macro28 Macro ' Example: Grades: [70,75,80,85,90][70, 75, 80, 85, 90], N=5N = 5: ' "&chr(10)&" 1. Mean: ' "&chr(10)&" ' "&chr(10)&" μ=70+75+80+85+905=80.\mu = \frac{70 + 75 + 80 + 85 + 90}{5} = 80. ' "&chr(10)&" 2. Variance: ' "&chr(10)&" ' "&chr(10)&" s2=(70-80)2+(75-80)2+(80-80)2+(85-80)2+(90-80)25=50.\sigma^2 = \frac{(70-80)^2 + (75-80 ' End Sub Sub Macro29() ' ' Macro29 Macro ' a) Energy in Capacitors '

' "&chr(10)&"Formula: $$ E = \frac{1}{2} C V^2 $$ Where: ' "&chr(10)&"· CC: Capacitance (Farads), ' "&chr(10)&"· VV: Voltage (Volts). '

' "&chr(10)&"Example: For a 10 μF10 , \mu F capacitor with V=240VV = 240V: $$ E = \frac{1}{2} \times 10 \times 10^{-6} \times 240^2 = 0.288 ' End Sub Sub Macro30() ' ' Macro30 Macro ' ' "&chr(10)&" B=?0Tc(t) dt,B = \int_0^T c(t) , dt, ' "&chr(10)&" ' "&chr(10)&" where c(t)c(t): cost rate over time tt. ' "&chr(10)&" ' "&chr(10)&" Example: For c(t)=200-20tc(t) = 200 - 20t over [0,5][0, 5]: ' "&chr(10)&" 1. Compute: ' "&chr(10)&" ' "&chr(10)&" [B = \int_0^5 (200 - 20t) , dt = \left[200t - 10t2\right]*05.]* ' *"&chr(10)&" 2. Result:* ' *"&chr(10)&"* ' *End Sub Sub Macro31()* ' ' *Macro31 Macro* ' *For time-dependent power P(t)P(t), energy is: $$ E = \int*{t_1}^{t_2} P(t) , dt
$.IfP(t) = 100sin?(2pt)P(t) = 100\sin(2\pi t), calculateenergyovert = 0t = 0tot = 1st = 1s:$ E = \int_0^1 100 \sin(2\pi t) , dt = \left[-\frac{100}{2\pi} \cos(2\pi t)
' End Sub Sub Macro32() ' ' Macro32 Macro ' 5. Predictive Analytics for Crime Prevention ' "&chr(10)&"Using linear regression to predict crime patterns: ' "&chr(10)&" ' "&chr(10)&"y=mx+b,y = mx + b, ' "&chr(10)&"where: ' "&chr(10)&"· yy: Predicted crime rate, ' End Sub Sub Macro33() ' ' Macro33 Macro ' Example: If m=0.02 crimes/personm = 0.02 , \text{crimes/person}, b=10b = 10: ' "&chr(10)&"1. For x=1000x = 1000: ' "&chr(10)&" ' "&chr(10)&"y=0.02·1000+10=30 crimes.y = 0.02 \cdot 1000 + 10 = 30 , \text{crimes}. '

' End Sub Sub Macro34() ' ' Macro34 Macro ' Applications in Crime Resolution and Prevention ' "&chr(10)&"1. Forensic Investigations: ' "&chr(10)&"o Use ballistic and decay models to reconstruct crime scenes. ' "&chr(10)&"2. Crime Scene Management: ' "&chr(10)&"o Employ area estimation to secure and document crime perimeters. ' "&chr(10)&"3. Predictive ' End Sub Sub Macro35() ' ' Macro35 Macro ' 1. Evidence Decay Over Time Using Exponential Models ' "&chr(10)&"Physical evidence, such as DNA or chemical residues, decays over time, which can be modeled using exponential decay: ' "&chr(10)&" ' "&chr(10)&"C(t)=C0e-?t,C(t) = C_ ' End Sub Sub Macro36() ' ' Macro36 Macro ' ' "&chr(10)&"y˜57.7-0.27=57.43 m.y \approx 57.7 - 0.27 = 57.43 , \text{m}. ' "&chr(10)&"3. Area Estimation for Crime Scene Management ' "&chr(10)&"Using calculus, calculate the area of irregular crime scene perimeters. Divide the boundary into segments described by functions, and integ ' End Sub Sub Macro37() ' ' Macro37 Macro ' 4. Surveillance Analysis Using Camera Rotation ' "&chr(10)&"The angular velocity of a surveillance camera can be modeled as: ' "&chr(10)&" ' "&chr(10)&"?(t)=?t+12at2,\theta(t) = \omega t + \frac{1}{2} \alpha t^2, ' "&chr(10)&"where: ' "&chr(10)&"· ?(t)\theta(t): Angle rotated, ' "&chr(10)&"· ?\omega: Initial angular vel ' End Sub Sub Macro38() ' ' Macro38 Macro ' 1. Management Information Systems in Policing ' "&chr(10)&"Background: ' "&chr(10)&"·

Management Information Systems (MIS) in policing are designed to collect, analyze, and disseminate crime data for decision-making and resource allocation. ' "&chr(10)&"· Applications include crime mappi ' End Sub Sub Macro39() ' ' Macro39 Macro ' Applied Policing and Crime Resolution ' End Sub Sub Macro40() ' ' Macro40 Macro ' 2. Investigative Techniques ' "&chr(10)&"•?Key Concepts: ' "&chr(10)&"o Conducting preliminary investigations. ' "&chr(10)&"o Using surveillance and undercover operations. '

' End Sub Sub Macro41() ' ' Macro41 Macro ' 3. Evidence Handling and Analysis ' "&chr(10)&"•?Principles: ' "&chr(10)&"o Proper collection, labeling, and storage of evidence. '

' End Sub Sub Macro42() ' ' Macro42 Macro ' 4. Legal Framework ' "&chr(10)&"•?Key Topics: ' "&chr(10)&"o Understanding the Criminal Procedure Act and Evidence Act. '

' End Sub Sub Macro43() ' ' Macro43 Macro ' Applications in Law Enforcement ' "&chr(10)&"1. Forensic Investigation: ' "&chr(10)&"o Analyze evidence to reconstruct crime scenes. ' "&chr(10)&"2. Criminal Profiling: ' "&chr(10)&"o Use psychological and behavioral analysis to identify suspects. ' "&chr(10)&"3. Community Engagement: '

' End Sub Sub Macro44() ' ' Macro44 Macro ' 3. Area Estimation for Crime Scene Management ' "&chr(10)&"Using calculus, calculate the area of irregular crime scene perimeters. Divide the boundary into segments described by functions, and integrate: ' "&chr(10)&" ' "&chr(10)&"A=?x1x2y(x) dx.A = \int_{x_1} ^{x_2} y(x) , dx. '

' End Sub Sub Macro45() ' ' Macro45 Macro ' 5. Predictive Analytics for Crime Prevention ' "&chr(10)&"Using linear regression to predict crime patterns: ' "&chr(10)&" ' "&chr(10)&"y=mx+b,y = mx + b, ' "&chr(10)&"where: ' "&chr(10)&"•?yy: Predicted crime rate, ' "&chr(10)&"•?xx: Variable (e.g., population density), ' "&chr(10)&"•?mm: Slope of the trendline, ' "&chr(10)&"•?bb: Intercept. '

' ActiveWindow.ActivePane.VerticalPercentScrolled = -145 End Sub Sub Macro46() ' ' Macro46 Macro ' 5. Predictive Analytics for Crime Prevention ' "&chr(10)&"Using linear regression to predict crime patterns: ' "&chr(10)&" ' "&chr(10)&"y=mx+b,y = mx + b, ' "&chr(10)&"where: ' "&chr(10)&"•?yy: Predicted crime rate, ' "&chr(10)&"•?xx: Variable (e.g., population density), ' "&chr(10)&"•?mm: Slope of the trendline, ' "&chr(10)&"•?bb: Intercept. '

' End Sub Sub Macro47() ' ' Macro47 Macro ' 2. Incident Collision Scenarios ' "&chr(10)&"Background: ' "&chr(10)&"•?Focuses on investigating road traffic collisions to determine causes and prevent future incidents. ' "&chr(10)&"•?Includes analyzing human, vehicle, and environmental factors. '

' ActiveWindow.ActivePane.SmallScroll Down:=23 End Sub Sub Macro48() ' ' Macro48 Macro ' 2. Incident Collision Scenarios ' "&chr(10)&"Background: ' "&chr(10)&"•?Focuses on investigating road traffic collisions to determine causes and prevent future incidents. ' "&chr(10)&"•?Includes analyzing human, vehicle, and environmental factors. '

' End Sub Sub Macro49() ' ' Macro49 Macro ' 4. Community Policing and Communication Skills ' "&chr(10)&"Background: ' "&chr(10)&"•?Community policing emphasizes collaboration between police and communities to solve problems and build trust. ' "&chr(10)&"•?Effective communication skills are essential for engaging with diverse populati ' End Sub Sub Macro50() ' ' Macro50 Macro ' 5. Operational Performance in Traffic Management ' "&chr(10)&"Background: ' "&chr(10)&"•?Traffic management involves optimizing road safety and flow through enforcement and education. ' "&chr(10)&"•?Operational performance measures include response times and accident reduction rates. ' "&chr(10)&"Exper ' End Sub Sub Macro51() ' ' Macro51 Macro ' 6. Principles of Police Investigation ' "&chr(10)&"Background: ' "&chr(10)&"•?Investigative principles include evidence preservation, chain of custody, and impartiality. ' "&chr(10)&"•?Focuses on systematic approaches to solving crimes. ' "&chr(10)&"Experimental Applications: ' "&chr(10)&"•?Conduct mock crime scen ' End Sub Sub Macro52() ' ' Macro52 Macro ' 7. Study Material for Police Firearms ' "&chr(10)&"Background: ' "&chr(10)&"•?Covers firearm handling, safety, and competency testing. ' "&chr(10)&"•?Includes theoretical knowledge and practical training. ' "&chr(10)&"Experimental Applications: ' "&chr(10)&"•?Practice firearm handling and target shooting in contro ' End Sub Sub Macro53() ' ' Macro53 Macro ' 1. Management Information Systems (MIS): Optimizing Police Patrol ' "&chr(10)&"•?Crime Hotspot

Macro " 1. Management Information Systems (MIS): Optimizing Police Patrol " &chr(10)&" 4.Crime Hotspot Modeling Using Integrals: Crime density in a region can be modeled as a density function f(x,y)f(x, y), where xx and yy are spatial coordinates. ' "&chr(10)&"o Total crime density in a ' End Sub Sub Macro54() ' ' Macro54 Macro ' ' "&chr(10)&"D=?02p?02(r2) r dr d?.D = \int_0^{2\pi} \int_0^2 (r^2) , r , dr , d\theta. ' "&chr(10)&"2. Compute: ' "&chr(10)&"[D = \int_0^{2\pi} \int_0^2 r^3 , dr , d\theta = \int_0^{2\pi} \left[\frac{r4}{4}\right]_02 d\theta = \int_0^{2\pi} 4 d\theta = 8\pi.] '

' End Sub Sub Macro55() ' ' Macro55 Macro ' 2. Incident Collision Scenarios ' "&chr(10)&"•?Projectile Motion and Trajectories: Use derivatives to determine speed and angles during a collision or vehicle impact. ' "&chr(10)&"o Position as a function of time s(t)s(t): ' "&chr(10)&" ' "&chr(10)&"v(t)=dsdt,a(t)=dvdt.v(t) = \frac{ds}{dt}, \quad a(' End Sub Sub Macro56() ' ' Macro56 Macro ' Example: If s(t)=5t2+2ts(t) = 5t^2 + 2t, calculate velocity and acceleration: ' "&chr(10)&"1. Velocity: ' "&chr(10)&" ' "&chr(10)&"v(t)=dsdt=10t+2.v(t) = \frac{ds}{dt} = 10t + 2. ' "&chr(10)&"2. Acceleration: ' "&chr(10)&" ' "&chr(10)&"a(t)=dvdt=10 m/s2.a(t) = \frac{dv}{dt} = 10 , \text{m/s}^2. '

' End Sub Sub Macro57() ' ' Macro57 Macro ' 3. Patrol Research and Route Optimization ' "&chr(10)&"•?Travel Path Optimization Using Integrals: Minimize distance covered by patrol cars along a curve y=f(x)y = f(x). ' "&chr(10)&"o Total patrol distance: ' "&chr(10)&" ' "&chr(10)&"L=?ab1+(dydx)2 dx.L = \int_a^b \sqrt{1 + \left(\frac{dy}{dx}\righ ' ActiveWindow.ActivePane.SmallScroll Down:=18 End Sub Sub Macro58() ' ' Macro58 Macro ' Example: If y=x2y = x^2 and xx ranges from 0 to 1: ' "&chr(10)&"1. Compute dydx=2x\frac{dy}{dx} = 2x, so: ' "&chr(10)&" ' "&chr(10)&"L=?011+(2x)2 dx=?011+4x2 dx.L = \int_0^1 \sqrt{1 + (2x)^2} , dx = \int_0^1 \sqrt{1 + 4x^2} , dx. ' "&chr(10)&"2. Approximate using numerical methods. '

' End Sub Sub Macro59() ' ' Macro59 Macro ' Example: If y=x2y = x^2 and xx ranges from 0 to 1: ' "&chr(10)&"1. Compute dydx=2x\frac{dy}{dx} = 2x, so: ' "&chr(10)&" ' "&chr(10)&"L=?011+(2x)2 dx=?011+4x2 dx.L = \int_0^1 \sqrt{1 + (2x)^2} , dx = \int_0^1 \sqrt{1 + 4x^2} , dx. ' "&chr(10)&"2. Approximate using numerical methods. '

' End Sub Sub Macro60() ' ' Macro60 Macro ' Example: If y=x2y = x^2 and xx ranges from 0 to 1: ' "&chr(10)&"1. Compute dydx=2x\frac{dy}{dx} = 2x, so: ' "&chr(10)&" ' "&chr(10)&"L=?011+(2x)2 dx=?011+4x2 dx.L = \int_0^1 \sqrt{1 + (2x)^2} , dx = \int_0^1 \sqrt{1 + 4x^2} , dx. ' "&chr(10)&"2. Approximate using numerical methods. '

' End Sub Sub Macro61() ' ' Macro61 Macro ' 1. Compute: ' "&chr(10)&"[I = \int_0^3 10t^2 , dt = \left[\frac{10t3}{3}\right]_03 = 90 , \text{Ns}.] '

' ActiveWindow.ActivePane.SmallScroll Down:=17 End Sub Sub Macro62() ' ' Macro62 Macro ' 5. Investigation Principles ' "&chr(10)&"•?Decay of Evidence Using Exponential Models: Biological or chemical evidence decays over time, modeled by: ' "&chr(10)&" ' "&chr(10)&"C(t)=C0e-?t,C(t) = C_0 e^{-\lambda t}, ' "&chr(10)&"where ?\lambda is the decay rate. ' "&chr(10)&"Example: For C0=100 ngC_0 = 100 , \t ' End Sub Sub Macro63() ' ' Macro63 Macro ' 6. Firearm Ballistics ' "&chr(10)&"•?Trajectory Calculations: The path of a bullet can be calculated using physics and derivatives: ' "&chr(10)&"o Horizontal range: ' "&chr(10)&" ' "&chr(10)&"R=v02sin?2?g,R = \frac{v_0^2 \sin 2\theta}{g}, ' "&chr(10)&"where v0v_0: initial velocity, ?\theta: angle, g=9.8 m/s2g = ' ActiveWindow.ActivePane.SmallScroll Down:=40 End Sub Sub Macro64() ' ' Macro64 Macro ' Example: If v0=300 m/sv_0 = 300 , \text{m/s} and ?=45°\theta = 45^\circ: ' "&chr(10)&"1. Range: ' "&chr(10)&" ' "&chr(10)&"R=3002sin?90°9.8=900009.8˜9183.67 m.R = \frac{300^2 \sin 90^\circ}{9.8} = \frac{90000}{9.8} \approx 9183.67 , \text{m}. '

' ActiveWindow.ActivePane.SmallScroll Down:=20 End Sub Sub Macro65() ' ' Macro65 Macro ' Example: If v0=300 m/sv_0 = 300 , \text{m/s} and ?=45°\theta = 45^\circ: ' "&chr(10)&"1. Range: ' "&chr(10)&" ' "&chr(10)&"R=3002sin?90°9.8=900009.8˜9183.67 m.R = \frac{300^2 \sin 90^\circ}{9.8} = \frac{90000}{9.8} \approx 9183.67 , \text{m}. '

' ActiveWindow.ActivePane.LargeScroll Down:=1 ActiveWindow.ActivePane.VerticalPercentScrolled = 0 End Sub

UserForm14 - 1 Private Sub Label1_Click() End Sub Private Sub Label4_Click() End Sub Private Sub

Label9_Click() End Sub Private Sub MultiPage1_Change() End Sub Private Sub OptionButton1_Click() End Sub Private Sub SpinButton1_Change() End Sub Private Sub SpinButton2_Change() End Sub Private Sub TabStrip1_Change() End Sub Private Sub TextBox1_Change() End Sub Private Sub TextBox11_Change() End Sub Private Sub TextBox13_Change() End Sub Private Sub TextBox16_Change() End Sub Private Sub TextBox17_Change() End Sub Private Sub TextBox18_Change() End Sub Private Sub TextBox19_Change() End Sub Private Sub TextBox20_Change() End Sub Private Sub TextBox22_Change() End Sub Private Sub TextBox3_Change() End Sub Private Sub TextBox4_Change()UserForm14 - 2 End Sub Private Sub TextBox5_Change() End Sub Private Sub TextBox6_Change() End Sub Private Sub TextBox8_Change() End Sub Private Sub TextBox9_BeforeDragOver(ByVal Cancel As MSForms.ReturnBoolean, ByVal Data As MSForms.DataO bject, ByVal X As Single, ByVal Y As Single, ByVal DragState As MSForms.fmDragState, ByVal Effect As M SForms.ReturnEffect, ByVal Shift As Integer) End Sub Private Sub TextBox9_BeforeDropOrPaste(ByVal Cancel As MSForms.ReturnBoolean, ByVal Action As MSForms. fmAction, ByVal Data As MSForms.DataObject, ByVal X As Single, ByVal Y As Single, ByVal Effect As MSFo rms.ReturnEffect, ByVal Shift As Integer) End Sub Private Sub TextBox9_BeforeUpdate(ByVal Cancel As MSForms.ReturnBoolean) End Sub Private Sub TextBox9_Change() End Sub Private Sub TextBox9_DblClick(ByVal Cancel As MSForms.ReturnBoolean) End Sub Private Sub TextBox9_DropButtonClick() End Sub Private Sub TextBox9_Enter() End Sub Private Sub TextBox9_Error(ByVal Number As Integer, ByVal Description As MSForms.ReturnString, ByVal S Code As Long, ByVal Source As String, ByVal HelpFile As String, ByVal HelpContext As Long, ByVal Cance lDisplay As MSForms.ReturnBoolean) End Sub Private Sub TextBox9_Exit(ByVal Cancel As MSForms.ReturnBoolean) End Sub Private Sub TextBox9_KeyDown(ByVal KeyCode As MSForms.ReturnInteger, ByVal Shift As Integer) End Sub Private Sub TextBox9_KeyPress(ByVal KeyAscii As MSForms.ReturnInteger) End Sub Private Sub TextBox9_MouseDown(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByV al Y As Single) End Sub Private Sub TextBox9_MouseMove(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByV al Y As Single)UserForm14 - 3 End Sub Private Sub TextBox9_MouseUp(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByVal Y As Single) End Sub Private Sub UserForm_Click() End Sub1. Management Information Systems in Policing Background: · Management Information Systems (MIS) in policing are designed to collect, analyze, and disseminate crime data for decision-making and resource allocation. · Applications include crime mapping, resource tracking, and performance monitoring. Experimental Applications: · Simulate crime data entry and analysis using MIS tools. · Develop crime heatmaps to identify hotspots and allocate patrols effectively. //policy academic poe s assessment policy poes student outcome visited theory 30, 70 practical center criminal record center managemnt system information "text label 2 "=Background: Applied P Applied Policing and Crime Resolution Applications in Law Enforcement Applications in Crime Resolution and Prevention 2. Incident Collision Scenarios Research Methods for Conducting Patrols "txt_label3"=true "txt_label 4"=true. Crime Scene Mana "txt _label 5"=true "txt_lbl6"=true "txt_lbl7"=true "txt _lbl"8=true 4. Community Policing and Communication Skills Operational Performance in Traffic Management "txt_label9"=true Principles of Police Investigation Study Material for Police Firearms

1. Crime Prevention: Traffic Safety Community Engagement "txt_label10"=true "txt_label11"=true "txt_label12"=true "txt_label13"=true "txt_label14"=true "txt_label15"=true O Frame1 ok cancel next rigth protectiREPUBLIC OF SOUTH AFRICA The Department of Justice and Constitutional Development (DOJ&CD IN THE HIGH COURT OF SOUTH AFRICA boysen court office Appeal Case Number: Ja 37/19,, ja 2461/15,; A Quo Case Number:

Begin {C62A69F0-16DC-11CE-9E98-00AA00574A4F} UserForm14 Caption = "UserForm14" ClientHeight = 10068 ClientLeft = 108 ClientTop = 456 ClientWidth = 20112 OleObjectBlob = "UserForm14 policy project excell word cae macro , tshingombe.frx":0000 StartUpPosition = 3 'Windows Default WhatsThisButton = -1 'True WhatsThisHelp = -1 'True End Attribute VB_Name = "UserForm14" Attribute VB_GlobalNameSpace = False Attribute VB_Creatable = False Attribute VB_PredeclaredId = True Attribute VB_Exposed = False Private Sub Label1_Click()

End Sub

Private Sub Label4_Click()

```
End Sub

Private Sub Label9_Click()

End Sub

Private Sub MultiPage1_Change()

End Sub

Private Sub OptionButton1_Click()

End Sub

Private Sub SpinButton1_Change()

End Sub

Private Sub SpinButton2_Change()

End Sub

Private Sub TabStrip1_Change()

End Sub

Private Sub TextBox1_Change()

End Sub

Private Sub TextBox11_Change()

End Sub

Private Sub TextBox13_Change()

End Sub

Private Sub TextBox16_Change()

End Sub

Private Sub TextBox17_Change()

End Sub

Private Sub TextBox18_Change()

End Sub

Private Sub TextBox19_Change()

End Sub

Private Sub TextBox20_Change()

End Sub

Private Sub TextBox22_Change()

End Sub

Private Sub TextBox3_Change()
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End Sub

Private Sub TextBox4_Change()

End Sub

Private Sub TextBox5_Change()

End Sub

Private Sub TextBox6_Change()

End Sub

Private Sub TextBox8_Change()

End Sub

Private Sub TextBox9_BeforeDragOver(ByVal Cancel As MSForms.ReturnBoolean, ByVal Data As
MSForms.DataObject, ByVal X As Single, ByVal Y As Single, ByVal DragState As MSForms.fmDragState, ByVal
Effect As MSForms.ReturnEffect, ByVal Shift As Integer)

End Sub

Private Sub TextBox9_BeforeDropOrPaste(ByVal Cancel As MSForms.ReturnBoolean, ByVal Action As
MSForms.fmAction, ByVal Data As MSForms.DataObject, ByVal X As Single, ByVal Y As Single, ByVal Effect As
MSForms.ReturnEffect, ByVal Shift As Integer)

End Sub

Private Sub TextBox9_BeforeUpdate(ByVal Cancel As MSForms.ReturnBoolean)

End Sub

Private Sub TextBox9_Change()

End Sub

Private Sub TextBox9_DblClick(ByVal Cancel As MSForms.ReturnBoolean)

End Sub

Private Sub TextBox9_DropButtonClick()

End Sub

Private Sub TextBox9_Enter()

End Sub

Private Sub TextBox9_Error(ByVal Number As Integer, ByVal Description As MSForms.ReturnString, ByVal
SCode As Long, ByVal Source As String, ByVal HelpFile As String, ByVal HelpContext As Long, ByVal
CancelDisplay As MSForms.ReturnBoolean)

End Sub

Private Sub TextBox9_Exit(ByVal Cancel As MSForms.ReturnBoolean)

End Sub

Private Sub TextBox9_KeyDown(ByVal KeyCode As MSForms.ReturnInteger, ByVal Shift As Integer)

End Sub
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End Sub

Private Sub TextBox9_KeyPress(ByVal KeyAscii As MSForms.ReturnInteger)

End Sub

Private Sub TextBox9_MouseDown(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByVal Y As Single)

End Sub

Private Sub TextBox9_MouseMove(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByVal Y As Single)

End Sub

Private Sub TextBox9_MouseUp(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByVal Y As Single)

End Sub

Private Sub UserForm_Click()

End Sub

Sub Macro2() ' ' Macro2 Macro ' current (I=dQdtI = \frac{dQ}{dt}), where the derivative of charge with respect to time gives the current. ' "&chr(10)&" · Integral Function (?f(x,y)dx\int f(x, y) dx): ' End Sub Sub Macro3() ' ' Macro3 Macro ' · Integral Function (?f(x,y)dx\int f(x, y) dx): ' End Sub Sub Macro4() ' ' Macro4 Macro ' Calculating the total energy in a capacitor (W=?V dQW = \int V , dQ) or the area under the voltage-time graph for evaluating work done. ' End Sub Sub Macro5() ' ' Macro5 Macro ' : $W = \int_0^Q V, dQ$ ' "&chr(10)&" § Here, WW represents the energy stored, VV is voltage, and QQ is charge. Integration helps calculate the energy based on the charge distribution. ' "&chr(10)&" o Inductors: $$V = L \frac{dI}{dt ' End Sub Sub Macro6() ' ' Macro6 Macro ' Rate of Change in Current: $I = \frac{dQ}{dt}$ ' "&chr(10)&" § This derivative links the charge flowing through a conductor over time to the current. ' "&chr(10)&" o Voltage in Changing Magnetic Fields (Faraday's Law): $$\mathcal{E} ' End Sub Sub Macro7() ' ' Macro7 Macro ' 1. Junior-Level Focus: ' "&chr(10)&" o Electrical Trade Theory (N1-N3): ' "&chr(10)&" § Covers foundational concepts like safety precautions, DC theory, conductors, and wiring systems. ' "&chr(10)&" § Practical applications i ' End Sub Sub Macro8() ' ' Macro8 Macro ' 1. Voltage Across a Capacitor: $V(t) = \frac{1}{C}\int i(t), dt + V_0$ ' "&chr(10)&" o Application: Determines voltage V(t)V(t) across a capacitor, where i(t)i(t) is the current, CC is capacitance, and V0V_0 is the initial voltage. ' End Sub Sub Macro9() ' ' Macro9 Macro ' 2. Total Energy Stored in an Inductor: $E = \frac{1}{2}L\int i^2(t), dt$ · "&chr(10)&" o Application: Calculates energy in an inductor, where LL is inductance and i(t)i(t) is current. '

' End Sub Sub Macro10() ' ' Macro10 Macro ' 3. Charge in a Circuit: $Q = \int I(t), dt$ ' "&chr(10)&" o Application: Finds the total electric charge QQ flowing through a circuit over time, based on current I(t)I(t). ' End Sub Sub Macro11() ' ' Macro11 Macro ' 1. Current in a Capacitor: $I(t) = C\frac{dV(t)}{dt}$ ' "&chr(10)&" o Application: Relates the rate of change of voltage to the current flowing through a capacitor. ' "&chr(10)&" 2. Electromotive Force (Faraday's Law): $$\mathcal{E} ' End Sub Sub Macro12() ' ' Macro12 Macro ' Circuit Analysis: ' "&chr(10)&" o Use integrals and derivatives to analyze RLC circuits and measure power dissipation. ' "&chr(10)&" · Measuring Instruments: ' "&chr(10)&" o Apply calculus to calibrate and interpret readings ' End Sub Sub Macro13() ' ' Macro13 Macro ' Circuit Analysis: ' "&chr(10)&" o Use integrals and derivatives to analyze RLC circuits and measure power dissipation. ' "&chr(10)&" · Measuring Instruments: ' "&chr(10)&" o Apply calculus to calibrate and interpret readings ' End Sub Sub Macro14() ' ' Macro14 Macro ' 1. Junior-Level Roles: Maintenance technician, soldering specialist, or assistant in electrical installations. ' "&chr(10)&" 2. Senior-Level Roles: Electrical engineer, system designer, or project manager overseeing large-scale installations and ' End Sub Sub Macro1() ' ' Macro1 Macro ' · Derivative Function (f'(x, y)): ' "&chr(10)&" o Derivatives measure the rate of change of a function, essential for analyzing varying electrical quantities like current (I), voltage (V), and resistance (R). ' "&chr(10)&" o Example in '

End Sub Sub Macro15() ' ' Macro15 Macro ' ?f(x)g'(x)dx=f(x)g(x)-?g(x)f'(x)dx.\int f(x) g'(x) dx = f(x) g(x) - \int g(x) f'(x) dx. ' "&chr(10)&" · Example: Integrate ?xexdx\int x e^x dx: ' "&chr(10)&" 1. Set f(x)=xf(x) = x and g'(x)=exg'(x) = e^x. ' End Sub Sub Macro16() ' ' Macro16 Macro ' ' "&chr(10)&" f'(x)=1,g(x)=ex.f'(x) = 1, \quad g(x) = e^x. ' "&chr(10)&" 3. Apply the formula: ' "&chr(10)&" ' "&chr(10)&" ?xexdx=xex-?exdx=xex-ex+C.\int x e^x dx = x e^x - \int e^x dx = x e^x - e^x + C. ' Selection.MoveDown Unit:=wdLine, Count:=19 End Sub Sub Macro17() ' ' Macro17 Macro ' ' "&chr(10)&" f'(x)=1,g(x)=ex.f'(x) = 1, \quad g(x) = e^x. ' "&chr(10)&" 3. Apply the formula: ' "&chr(10)&" ' "&chr(10)&" ?xexdx=xex-?exdx=xex-ex+C.\int x e^x dx = x e^x - \int e^x dx = x e^x - e^x + C. ' End Sub Sub Macro18() ' ' Macro18 Macro ' ' "&chr(10)&" ?sin?2(x)dx=?12dx-?cos?(2x)2dx=x2-sin?(2x)4+C.\int \sin^2(x) dx = \int \frac{1}{2} dx - \int \frac{\cos(2x)}{2} dx = \frac{x}{2} - \frac{\sin(2x)}{4} + C. ' "&chr(10)&" 3. Completing the Square: ' "&chr(10)&" o Transform qu ' End Sub Sub Macro19() ' ' Macro19 Macro ' ' "&chr(10)&" o Example: Integrate ?1x2+6x+10dx\int \frac{1}{x^2 + 6x + 10} dx. ' "&chr(10)&" § Complete the square: x2+6x+10=(x+3)2+1x^2 + 6x + 10 = (x + 3)^2 + 1. ' "&chr(10)&" § Use the formula for inverse tangent: ' "&chr(10)&" ' End Sub Sub Macro20() ' ' Macro20 Macro ' ' "&chr(10)&" 2(x+3)3?Ax+3+B(x+3)2+C(x+3)3.\frac{2}{(x+3)^3} \to \frac{A}{x+3} + \frac{B}{(x+3)^2} + \frac{C}{(x+3)^3}. ' "&chr(10)&" · Case 2: Two Recursive Factors: ' "&chr(10)&" ' "&chr(10)&" 5x(x-1)2(2x-5)?A(x-1)+B(x-1)2+C ' End Sub Sub Macro21() ' ' Macro21 Macro ' 5x(x-1)2(2x-5)?A(x-1)+B(x-1)2+C(2x-5).\frac{5x}{(x-1)^2 (2x-5)} \to \frac{A}{(x-1)} + \frac{B}{(x-1)^2} + \frac{C}{(2x-5)}. ' End Sub Sub Macro22() ' ' Macro22 Macro ' 5x(x-1)2(2x-5)?A(x-1)+B(x-1)2+C(2x-5).\frac{5x}{(x-1)^2 (2x-5)} \to \frac{A}{(x-1)} + \frac{B}{(x-1)^2} + \frac{C}{(2x-5)}. ' End Sub Sub Macro23() ' ' Macro23 Macro ' ' "&chr(10)&" A=?01[(x+2)-x2]dx=?01(-x2+x+2)dx.A = \int_0^1 [(x+2) - x^2] dx = \int_0^1 (-x^2 + x + 2) dx. ' "&chr(10)&" Compute: ' "&chr(10)&" ' "&chr(10)&" ?01(-x2+x+2)dx=[-x33+x22+2x]01=-13+12+2=136.\int_0^1 (-x^2 + x + 2) ' End Sub Sub Macro24() ' ' Macro24 Macro ' ' "&chr(10)&" V=p?ab[f(x)]2dx.V = \pi \int_a^b [f(x)]^2 dx. ' "&chr(10)&" · Shell Method: ' "&chr(10)&" ' "&chr(10)&" V=2p?abxf(x)dx.V = 2\pi \int_a^b x f(x) dx. '

' End Sub Sub Macro25() ' ' Macro25 Macro ' 1. Formula: ' "&chr(10)&" [V = \pi \int_0^1 (x)2 dx = \pi \int_0^1 x^4 dx.] ' "&chr(10)&" 2. Compute: ' "&chr(10)&" [V = \pi \left[\frac{x5}{5}\right]*01 = \frac{\pi}{5}.] ' *End Sub Sub Macro26()* ' ' *Macro26 Macro* ' *x2=4-x2 ? 2x2=4 ? x=±2.x^2 = 4 - x^2 \implies 2x^2 = 4 \implies x = \pm\sqrt{2}.* ' *"&chr(10)&" Intersection points are (2,2)(\sqrt{2}, 2) and (-2,2)(-\sqrt{2}, 2).* ' *End Sub Sub Macro27()* ' ' *Macro27 Macro* ' ' *"&chr(10)&" A=?-22[(4-x2)-x2]dx=?-22(4-2x2)dx.A = \int*{-\sqrt{2}}^{\sqrt{2}} [(4 - x^2) - x^2] dx = \int_{-\sqrt{2}}^{\sqrt{2}} (4 - 2x^2) dx. ' "&chr(10)&" Compute: ' "&chr(10)&" [A = [4x - \frac{2x3}{3}]_{-\sqrt{2}}{
' End Sub Sub Macro28() ' ' Macro28 Macro ' ' "&chr(10)&" x¯=?abx[f(x)-g(x)]dx?ab[f(x)-g(x)]dx.\bar{x} = \frac{\int_a^b x [f(x) - g(x)] dx}{\int_a^b [f(x) - g(x)] dx}. ' "&chr(10)&" · Example: For y=x2y = x^2, find x¯\bar{x} over [0,1][0, 1]: ' "&chr(10)&" ' "&chr(10)&" ' End Sub Sub Macro29() ' ' Macro29 Macro ' Compute numerator: ' "&chr(10)&" ' "&chr(10)&" ?01x3dx=x44|01=14.\int_0^1 x^3 dx = \frac{x^4}{4} \big|_0^1 = \frac{1}{4}. ' "&chr(10)&" Compute denominator: ' "&chr(10)&" ' "&chr(10)&" ?01x2dx=x33|01=13. ' End Sub Sub Macro30() ' ' Macro30 Macro ' ' "&chr(10)&" Ix=?ab[f(x)]2dx.I_x = \int_a^b [f(x)]^2 dx. ' "&chr(10)&" 2. Moment of Inertia: ' "&chr(10)&" o For solids: ' "&chr(10)&" ' "&chr(10)&" I=?abx2[f(x)]dx.I = \int_a^b x^2 [f(x)] dx. '

' End Sub Sub Macro31() ' ' Macro31 Macro ' : Find the area between y=x2y = x^2 and y=4-x2y = 4 - x^2 over x=-2x = -\sqrt{2} to x=2x = \sqrt{2}: ' "&chr(10)&" ' "&chr(10)&" A=?-22[(4-x2)-x2]dx=?-22(4-2x2)dx.A = \int_{-\sqrt{2}}^{\sqrt{2}} [(4 - x^2) - x^2] dx = \int_{-\sqrt{2}} ' End Sub Sub Macro32() ' ' Macro32 Macro ' Polar form representation (modulus r=x2+y2r = \sqrt{x^2 + y^2} and argument ?=tan?-1(y/x)\theta = \tan^{-1}(y/x)) is crucial for simplifying multiplications and divisions. ' End Sub Sub Macro33() ' ' Macro33 Macro ' o Formula: D=ad-bcD = ad - bc. ' "&chr(10)&" o Example Calculation: If D=[63-23]D = \begin{bmatrix} 6 & 3 \ -2 & 3 \end{bmatrix}, then: ' "&chr(10)&" ' "&chr(10)&" D=(6·3)-(3·-2)=18+6=24.D = (6 \cdot 3) - (3 \cdot -2) = 18 ' Selection.MoveDown Unit:=wdLine, Count:=22 End Sub Sub Macro34() ' ' Macro34 Macro ' D=[abcdefghi],D = \begin{bmatrix} a & b & c \ d & e & f \ g & h & i \end{bmatrix}, ' "&chr(10)&" the determinant is: ' "&chr(10)&" ' "&chr(10)&" D=a(ei-fh)-b(di-fg)+c(dh-eg).D = a(ei - fh) - b(di - fg) + c(dh - eg). ' End Sub Sub Macro35() ' ' Macro35 Macro ' D=[abcdefghi],D = \begin{bmatrix} a & b & c \ d & e & f \ g & h & i \end{bmatrix}, ' "&chr(10)&" the determinant is: ' "&chr(10)&" ' "&chr(10)&" D=a(ei-fh)-b(di-fg)+c(dh-eg).D = a(ei - fh) - b(di - fg) + c(dh - eg). ' End Sub Sub Macro36() ' ' Macro36 Macro ' '

"&chr(10)&" o Using conjugates, divide (3+2i)(3 + 2i) by (1-i)(1 - i): Multiply numerator and denominator by (1+i)(1 + i): ' "&chr(10)&" [\frac{(3+2i)}{(1-i)} = \frac{(3+2i)(1+i)}{(1-i)(1+i)} = \frac{3+3i+2i+2i2}{1+12} = \frac{1+5i}{2}.] ' End Sub Sub Macro37() ' ' Macro37 Macro ' ' "&chr(10)&" o Convert z=3+4iz = 3 + 4i: Modulus: r=32+42=5r = \sqrt{3^2 + 4^2} = 5. Argument: ?=tan?-1(43)˜53.1°\theta = \tan^{-1}(\frac{4}{3}) \approx 53.1^\circ. Polar Form: z=5(cos?53.1°+isin?53.1°)z = 5(\cos 53.1^\circ + i\sin 53.1^\circ). ' Selection.MoveDown Unit:=wdLine, Count:=132 Selection.MoveUp Unit:=wdLine, Count:=36 End Sub Sub Macro38() ' ' Macro38 Macro ' ' "&chr(10)&" o Convert z=3+4iz = 3 + 4i: Modulus: r=32+42=5r = \sqrt{3^2 + 4^2} = 5. Argument: ?=tan?-1(43)˜53.1°\theta = \tan^{-1}(\frac{4}{3}) \approx 53.1^\circ. Polar Form: z=5(cos?53.1°+isin?53.1°)z = 5(\cos 53.1^\circ + i\sin 53.1^\circ). ' End Sub Sub Macro39() ' ' Macro39 Macro ' o x3?3x2x^3 \to 3x^2, 5x2?10x5x^2 \to 10x, -x?-1-x \to -1, 7?07 \to 0. ' "&chr(10)&" 2. Result: dydx=3x2+10x-1\frac{dy}{dx} = 3x^2 + 10x - 1. '

' Selection.MoveDown Unit:=wdLine, Count:=31 End Sub Sub Macro40() ' ' Macro40 Macro ' ' "&chr(10)&" (x+y)3=x3+3x2y+3xy2+y3.(x + y)^3 = x^3 + 3x^2y + 3xy^2 + y^3. ' "&chr(10)&" 3. Differentiation from First Principles: ' "&chr(10)&" o Define dydx\frac{dy}{dx} as: ' "&chr(10)&" ' "&chr(10)&" lim?h?0f(x+ ' End Sub Sub Macro41() ' ' Macro41 Macro ' o Let u=2xu = 2x, then: ' "&chr(10)&" ' "&chr(10)&" ddx[sin?(u)]=cos?(u)·dudx. \frac{d}{dx}[\sin(u)] = \cos(u) \cdot \frac{du}{dx}. ' "&chr(10)&" Substituting u=2xu = 2x: ' "&chr(10)&" ' "&chr(10)&" ddx[s ' Selection.MoveDown Unit:=wdLine, Count:=71 End Sub Sub Macro42() ' ' Macro42 Macro ' o Integrate ?xndx\int x^n dx: ' "&chr(10)&" ' "&chr(10)&" ?xndx=xn+1n+1+C(if n?-1).\int x^n dx = \frac{x^{n+1}}{n+1} + C \quad (\text{if } n \neq -1). ' "&chr(10)&" 2. Trigonometric Integration: ' "&chr(10)&" o Exa ' Selection.MoveDown Unit:=wdLine, Count:=150 End Sub Sub Macro43() ' ' Macro43 Macro ' ' "&chr(10)&" · Power Rule: If f(x)=xnf(x) = x^n, then f'(x)=n·xn-1f'(x) = n \cdot x^{n-1}. Example: f(x)=x3 ? f'(x)=3x2f(x) = x^3 \implies f'(x) = 3x^2. ' "&chr(10)&" · Constant Rule: If f(x)=cf(x) = c, where cc is constant, then f'(x)=0f'(x) = 0. Exam ' End Sub Sub Macro44() ' ' Macro44 Macro ' 2. Advanced Rules ' "&chr(10)&" For more complex functions: ' "&chr(10)&" · Product Rule: If f(x)=u(x)·v(x)f(x) = u(x) \cdot v(x), then f'(x)=u'(x)·v(x)+u(x)·v'(x)f'(x) = u'(x) \cdot v(x) + u(x) \cdot v'(x). Example: f(x)=x·sin?(x) ? ' End Sub Sub Macro45() ' ' Macro45 Macro ' Real-World Example ' "&chr(10)&" Let’s calculate the derivative of f(x)=3x2+5x+2f(x) = 3x^2 + 5x + 2, representing velocity in an engineering context: ' "&chr(10)&" 1. Differentiate each term: ' "&chr(10)&" o 3x2 ? 6x3x^2
' Selection.MoveDown Unit:=wdLine, Count:=145 End Sub Sub Macro46() ' ' Macro46 Macro ' o The limit describes the value a function approaches as the input gets close to a specific point. Notation: lim?x?af(x)\lim_{x \to a} f(x). ' "&chr(10)&" o Example: Find lim?x?2(x2-4)\lim_{x \to 2} (x^2 - 4): ' "&chr(10)&" ' End Sub Sub Macro47() ' ' Macro47 Macro ' o Forms like 00\frac{0}{0} are resolved by simplifying the function or applying L’Hôpital’s rule (if allowed). ' "&chr(10)&" 4. Continuity ' "&chr(10)&" 1. Definition: ' "&chr(10)&" o A function f(x)f(x) is continuous at x=a ' End Sub Sub Macro48() ' ' Macro48 Macro ' ' "&chr(10)&" ' "&chr(10)&" x=-4±42-4(2)(-6)2(2)=-4±16+484=-4±644.x = \frac{-4 \pm \sqrt{4^2 - 4(2)(-6)}}{2(2)} = \frac{-4 \pm \sqrt{16 + 48}}{4} = \frac{-4 \pm \sqrt{64}}{4}. ' "&chr(10)&" 3. Simplify: ' "&chr(10)&" ' End Sub Sub Macro49() ' ' Macro49 Macro ' ' "&chr(10)&" vr=vA2+vB2=402+302=1600+900=2500=50 km/h.v_r = \sqrt{v_A^2 + v_B^2} = \sqrt{40^2 + 30^2} = \sqrt{1600 + 900} = \sqrt{2500} = 50 , \text{km/h}. ' "&chr(10)&" 2. Shortest Distance: ' "&chr(10)&" o If both cars are moving tow ' Selection.MoveDown Unit:=wdLine, Count:=53 End Sub Sub Macro50() ' ' Macro50 Macro ' A ball is projected horizontally from a height of 5 m5 , \text{m} with an initial velocity of 10 m/s10 , \text{m/s}. Calculate the time of flight and range: ' "&chr(10)&" 1. Time of Flight: Using h=12gt2h = \frac{1}{2} g t^2, solve: ' End Sub Sub Macro51() ' ' Macro51 Macro ' ' "&chr(10)&" 5=12·9.8·t2 ? t=109.8˜1.01 s.5 = \frac{1}{2} \cdot 9.8 \cdot t^2 \implies t = \sqrt{\frac{10}{9.8}} \approx 1.01 , \text{s}. ' "&chr(10)&" 2. Range: Horizontal distance: x=v·tx = v \cdot t: ' "&chr(10)&" ' End Sub Sub Macro52() ' ' Macro52 Macro ' A wheel rotates at 10 rad/s10 , \text{rad/s} with an angular acceleration of 2 rad/s22 , \text{rad/s}^2. Find the angular displacement after 5 s5 , \text{s}: ' "&chr(10)&" 1. Use: ' "&chr(10)&" ' "&chr(10)&" ?=?t+12at2.\t ' Selection.MoveDown Unit:=wdLine, Count:=26 End Sub Sub Macro53() ' ' Macro53 Macro ' F=ma=1000·2=2000 N.F = ma = 1000 \cdot 2 = 2000 , \text{N}. ' Selection.MoveDown Unit:=wdLine, Count:=35 End Sub Sub Macro54() ' ' Macro54 Macro ' F=ma=1000·2=2000 N.F = ma = 1000 \cdot 2 = 2000 , \text{N}. ' Selection.MoveDown Unit:=wdLine, Count:=27 End Sub Sub Macro55() ' ' Macro55 Macro ' 1. Use F=P·AF = P \cdot A: ' "&chr(10)&" ' "&chr(10)&" A=p·(0.52)2=0.196 m2,A = \pi \cdot \left(\frac{0.5}{2}\right)^2 = 0.196 , \text{m}^2, ' "&chr(10)&" ' "&chr(10)&" F=500·0.196=98.1 kN.F = 500 \cdot 0.196 = 9 ' Selection.MoveDown Unit:=wdLine, Count:=27 End Sub Sub Macro56() ' ' Macro56 Macro '

Example: A steel rod with L=2 mL = 2 , \text{m} and cross-sectional area A=0.01 m2A = 0.01 , \text{m}^2 stretches by ?L=0.002 m\Delta L = 0.002 , \text{m}. Find the stress if E=2·105 MPaE = 2 \cdot 10^5 , \text{MPa}: ' "&chr(10)&" 1. Strain: ' End Sub Sub Macro57() ' ' Macro57 Macro ' 2. Stress: ' "&chr(10)&" ' "&chr(10)&" s=E·?=2·105·0.001=200 MPa.\sigma = E \cdot \epsilon = 2 \cdot 10^5 \cdot 0.001 = 200 , \text{MPa}. '

' End Sub Sub Macro58() ' ' Macro58 Macro ' A gas at 1 atm1 , \text{atm} and 300 K300 , \text{K} has a volume 2 m32 , \text{m}^3. Find its final volume if the pressure is halved: ' "&chr(10)&" 1. Using Boyle's Law (P1V1=P2V2P_1 V_1 = P_2 V_2): ' "&chr(10)&" ' Selection.MoveDown Unit:=wdLine, Count:=32 End Sub Sub Macro59() ' ' Macro59 Macro ' A gas at 1 atm1 , \text{atm} and 300 K300 , \text{K} has a volume 2 m32 , \text{m}^3. Find its final volume if the pressure is halved: ' "&chr(10)&" 1. Using Boyle's Law (P1V1=P2V2P_1 V_1 = P_2 V_2): ' "&chr(10)&" ' Selection.MoveDown Unit:=wdLine, Count:=24 End Sub Sub Macro60() ' ' Macro60 Macro ' 1. Angular Velocity: ' "&chr(10)&" ' "&chr(10)&" ?=at=4·3=12 rad/s.\omega = \alpha t = 4 \cdot 3 = 12 , \text{rad/s}. ' "&chr(10)&" 2. Work Done: ' "&chr(10)&" ' "&chr(10)&" W=12I?2=12·2·122=144 J.W =
' End Sub Sub Macro61() ' ' Macro61 Macro ' ' "&chr(10)&" P=Q·?P?,P = \frac{Q \cdot \Delta P}{\eta}, ' "&chr(10)&" where Q=0.5/60 m3/sQ = 0.5/60 , \text{m}^3/\text{s}, ?P=2×106 Pa\Delta P = 2 \times 10^6 , \text{Pa}, and assume ?=0.85\eta = 0.85: ' "&chr(10)&" ' End Sub Sub Macro62() ' ' Macro62 Macro ' ' "&chr(10)&" A=p·(0.025)2=1.96×10-3 m2.A = \pi \cdot (0.025)^2 = 1.96 \times 10^{-3} , \text{m}^2. ' "&chr(10)&" 2. Stress: ' "&chr(10)&" ' "&chr(10)&" s=FA=800001.96×10-3˜4.08×107 Pa.\sigma = \frac{F}{A} = \frac{80000}{1.96 ' End Sub Sub Macro63() ' ' Macro63 Macro ' Advanced Example: A gas undergoes an isothermal expansion from P1=3 atm,V1=2 m3P_1 = 3 , \text{atm}, V_1 = 2 , \text{m}^3 to V2=5 m3V_2 = 5 , \text{m}^3. Calculate the work done: ' "&chr(10)&" ' "&chr(10)&" W=P1V1ln?(V2V1),W = P_1 ' Selection.MoveDown Unit:=wdLine, Count:=173 End Sub Sub Macro64() ' ' Macro64 Macro ' Z=R2+(XL-XC)2,Z = \sqrt{R^2 + (X_L - X_C)^2}, ' "&chr(10)&" where XL=2pfLX_L = 2\pi fL and XC=12pfCX_C = \frac{1}{2\pi fC}. ' "&chr(10)&" · Use phasor diagrams to analyze voltage and current relationships. ' "&chr(10)&" · Pow ' End Sub Sub Macro65() ' ' Macro65 Macro ' o Resistance (RR) = 10 O10 , \Omega, ' "&chr(10)&" o Inductive Reactance (XLX_L) = 15 O15 , \Omega, ' "&chr(10)&" o Capacitive Reactance (XCX_C) = 5 O5 , \Omega: ' "&chr(10)&" ' "&chr(10)&" Z=R2+(XL-XC)2=102+(15 ' End Sub Sub Macro66() ' ' Macro66 Macro ' ' "&chr(10)&" Z=R2+(XL-XC)2=102+(15-5)2=100+100=14.14 O.Z = \sqrt{R^2 + (X_L - X_C)^2} = \sqrt{10^2 + (15 - 5)^2} = \sqrt{100 + 100} = 14.14 , \Omega. ' "&chr(10)&" General Assessment Guidelines ' "&chr(10)&" 1. Practical Applications: ' Selection.MoveDown Unit:=wdLine, Count:=61 End Sub Sub Macro67() ' ' Macro67 Macro ' Z=R2+(XL-XC)2,XL=2pfL,XC=12pfC.Z = \sqrt{R^2 + (X_L - X_C)^2}, \quad X_L = 2\pi fL, \quad X_C = \frac{1}{2\pi fC}. ' "&chr(10)&" 3. Resonance: ' "&chr(10)&" o Achieved when XL=XCX_L = X_C. Use: ' "&chr(10)&" ' Selection.MoveDown Unit:=wdLine, Count:=24 End Sub Sub Macro68() ' ' Macro68 Macro ' ' "&chr(10)&" Example Problem: A convection heater operates with 2 kW2 , \text{kW}. Find the energy used in 5 hours5 , \text{hours}: ' "&chr(10)&" ' "&chr(10)&" E=P·t=2·5=10 kWh.E = P \cdot t = 2 \cdot 5 = 10 , \text{kWh}. ' Selection.MoveDown Unit:=wdLine, Count:=21 End Sub Sub Macro69() ' ' Macro69 Macro ' Example Problem: An LED lamp uses 10 W10 , \text{W} and operates for 4 hours/day4 , \text{hours/day}. Calculate energy consumption in one month: ' "&chr(10)&" ' "&chr(10)&" E=P·t·days=10·4·30=1.2 kWh.E = P \cdot t \cdot \text{days} ' Selection.MoveDown Unit:=wdLine, Count:=28 Selection.MoveUp Unit:=wdLine, Count:=37 Selection.Copy End Sub Sub Macro70() ' ' Macro70 Macro ' Module 4: Programmable Logic Controllers (PLCs) ' "&chr(10)&" Key Topics: ' "&chr(10)&" · Define PLCs, their components, and their programming languages (e.g., ladder logic). ' "&chr(10)&" Practical Insights: PLC applications ' Selection.MoveDown Unit:=wdLine, Count:=23 Selection.Copy End Sub Sub Macro71() ' ' Macro71 Macro ' ' "&chr(10)&" o Calculate back emf: ' "&chr(10)&" ' "&chr(10)&" Eb=V-IaRa.E_b = V - I_aR_a. ' "&chr(10)&" 2. Motor Torque: ' "&chr(10)&" o Use: ' "&chr(10)&" ' "&chr(10)&" T=kIa?.T = k I_a \ph ' Selection.MoveDown Unit:=wdLine, Count:=17 Selection.Copy End Sub Sub Macro72() ' ' Macro72 Macro ' Example Problem: Find the torque of a DC motor with Ia=10 AI_a = 10 , \text{A}, ?=0.02 Wb\phi = 0.02 , \text{Wb}, and k=1k = 1: ' "&chr(10)&" ' "&chr(10)&" T=kIa?=1·10·0.02=0.2 Nm.T = k I_a \phi = 1 \cdot 10 \cdot 0.02 = 0.2 , \tex ' Selection.MoveRight Unit:=wdCharacter, Count:=1 Selection.MoveDown Unit:=wdLine, Count:=26 Selection.Copy End Sub Sub Macro73() ' ' Macro73 Macro ' ' "&chr(10)&" S=ns-nrns,ns=120fP.S = \frac{n_s - n_r}{n_s}, \quad n_s = \frac{120f}{P}. ' "&chr(10)&" Example Problem: For a motor with f=50 Hzf = 50 , \text{Hz} and P=4P = 4, calculate synchronous speed: ' "&chr(10)&" ' Selection.MoveDown Unit:=wdLine,

Count:=31 Selection.Copy End Sub Sub Macro74() ' ' Macro74 Macro ' ' "&chr(10)&" Example Problem: A transformer has Pcore=200 WP_{core} = 200 , \text{W} and Pcopper=300 WP_{copper} = 300 , \text{W}. Calculate efficiency when delivering Pout=1000 WP_{out} = 1000 , \text{W}: ' "&chr(10)&" ' "&chr(10)&" ? ' Selection.MoveDown Unit:=wdLine, Count:=20 Selection.Copy End Sub Sub Macro75() ' ' Macro75 Macro ' ' "&chr(10)&" · System earthing for safety and fault detection. ' "&chr(10)&" · Earthing networks and neutral conductor importance. ' "&chr(10)&" Practical Insights: Proper earthing prevents hazards such as electric shocks and ensures f ' Selection.MoveDown Unit:=wdLine, Count:=39 Selection.MoveUp Unit:=wdLine, Count:=1 Selection.MoveDown Unit:=wdLine, Count:=25 Selection.Copy End Sub Sub Macro76() ' ' Macro76 Macro ' ' "&chr(10)&" Enhanced Example: A geyser thermostat heats 50 kg50 , \text{kg} of water from 25°C25^\circ \text{C} to 80°C80^\circ \text{C}. Find the energy required if the specific heat capacity of water is 4200 J/kg°C4200 , \text{J/kg}^\circ\text{C}: ' Selection.MoveDown Unit:=wdLine, Count:=22 Selection.Copy End Sub Sub Macro77() ' ' Macro77 Macro ' ' "&chr(10)&" E=50·4200·55=11,550,000 J or 11.55 MJ.E = 50 \cdot 4200 \cdot 55 = 11,550,000 , \text{J} , \text{or} , 11.55 , \text{MJ}. ' "&chr(10)&" Module 3: Lighting Systems ' "&chr(10)&" Expanded Example: A compact f ' Selection.Copy Selection.Copy End Sub Sub Macro78() ' ' Macro78 Macro ' Expanded Example: A compact fluorescent lamp operates at 15 W15 , \text{W} for 10 hours/day10 , \text{hours/day}. Calculate energy consumption for 30 days30 , \text{days}. ' "&chr(10)&" Solution: ' "&chr(10)&" 1. Daily Energy: ' End Sub Sub Macro79() ' ' Macro79 Macro ' Edaily=P·t=15·10=150 Wh.E_{\text{daily}} = P \cdot t = 15 \cdot 10 = 150 , \text{Wh}. ' "&chr(10)&" 2. Monthly Energy: ' "&chr(10)&" ' "&chr(10)&" Emonthly=150·30=4500 Wh=4.5 kWh.E_{\text{monthly}} = 150 \cdot 30 = 4500 , ' Selection.Copy End Sub Sub Macro80() ' ' Macro80 Macro ' Advanced Torque Calculation: A DC motor draws Ia=15 AI_a = 15 , \text{A} with a magnetic flux of ?=0.03 Wb\phi = 0.03 , \text{Wb}. Find the armature torque if k=1.2k = 1.2. ' "&chr(10)&" Solution: ' "&chr(10)&" 1. Torque: ' Selection.Copy End Sub Sub Macro81() ' ' Macro81 Macro ' T=kIa?=1.2·15·0.03=0.54 Nm.T = k I_a \phi = 1.2 \cdot 15 \cdot 0.03 = 0.54 , \text{Nm}. ' "&chr(10)&" Module 6: Alternating Current Machines ' "&chr(10)&" Speed Analysis Example: For a three-phase induction motor with f=60 Hzf = 60 , ' Selection.Copy End Sub Sub Macro82() ' ' Macro82 Macro ' ' "&chr(10)&" ns=120fP=120·604=1800 RPM.n_s = \frac{120f}{P} = \frac{120 \cdot 60}{4} = 1800 , \text{RPM}. ' "&chr(10)&" 2. Rotor Speed: ' "&chr(10)&" ' "&chr(10)&" nr=ns(1-S)=1800(1-0.05)=1710 RPM.n_r = n_s (1 - S) = 1800 (' Selection.MoveDown Unit:=wdLine, Count:=198 Selection.Copy End Sub Sub Macro83() ' ' Macro83 Macro ' Promotional Mark: 40% ICASS + 60% Exam marks (minimum 40% required for exam qualification). ' "&chr(10)&" Exam Setup: ' "&chr(10)&" · Duration: 3 hours. ' "&chr(10)&" · Closed book, formula sheet included. ' Selection.Copy End Sub Sub Macro84() ' ' Macro84 Macro ' ' "&chr(10)&" o Application: 30–40%. ' "&chr(10)&" o Analysis/Evaluation: 20–25%. ' "&chr(10)&" Mark Allocation by Module ' "&chr(10)&" Module Weighting (%) ' "&chr(10)&" Principles of Electricity 30 '

' Selection.MoveDown Unit:=wdLine, Count:=43 Selection.Copy End Sub Sub Macro85() ' ' Macro85 Macro ' ' "&chr(10)&" B=μI2pr,B = \frac{\mu I}{2 \pi r}, ' "&chr(10)&" where μ\mu is permeability. ' "&chr(10)&" 3. Inductance in DC Circuits: ' "&chr(10)&" o Find inductance: ' "&chr(10)&" ' "&chr(10)&" L=N2μAl,L ' Selection.MoveDown Unit:=wdLine, Count:=65 ActiveWindow.ActivePane.VerticalPercentScrolled = -103 Selection.Copy End Sub Sub Macro86() ' ' Macro86 Macro ' ' "&chr(10)&" To calculate the energy dissipated in resistive circuits over time, use: ' "&chr(10)&" ' "&chr(10)&" E=?0TP(t) dt,P(t)=I(t)2R.E = \int_0^T P(t) , dt, \quad P(t) = I(t)^2 R. ' "&chr(10)&" Example: A resistor ' Selection.Copy End Sub Sub Macro87() ' ' Macro87 Macro ' ' "&chr(10)&" 1. Substitute I(t)I(t): ' "&chr(10)&" ' "&chr(10)&" E=?02(4sin?(pt))2·5 dt=5?0216sin?2(pt) dt.E = \int_0^2 (4 \sin(\pi t))^2 \cdot 5 , dt = 5 \int_0^2 16 \sin^2(\pi t) , dt. ' "&chr(10)&" 2. Simplify using sin?2(x)= ' Selection.Copy End Sub Sub Macro88() ' ' Macro88 Macro ' ' "&chr(10)&" 3. Solve: ' "&chr(10)&" ' "&chr(10)&" ?021 dt=2,?02cos?(2pt) dt=0.\int_0^2 1 , dt = 2, \quad \int_0^2 \cos(2\pi t) , dt = 0. ' "&chr(10)&" Thus: ' "&chr(10)&" ' "&chr(10)&" E=40·2=80 J.E ' Selection.Copy End Sub Sub Macro89() ' ' Macro89 Macro ' dVdt=IC,where I=VR.\frac{dV}{dt} = \frac{I}{C}, \quad \text{where } I = \frac{V}{R}. ' "&chr(10)&" Example: For V(t)=50exp?(-t/RC) VV(t) = 50 \exp(-t/RC) , \text{V}, calculate the rate of voltage drop at t=2 st = 2 , \text{s} given R=10 OR = 1 ' Selection.Copy End Sub Sub Macro90() ' ' Macro90 Macro ' 1. Differentiate V(t)V(t): ' "&chr(10)&" ' "&chr(10)&" dVdt=ddt(50exp?(-t/(10·0.01)))=50·-10.1exp?(-t/0.1). \frac{dV}{dt} = \frac{d}{dt} \left(50 \exp(-t/(10 \cdot 0.01)) \right) = 50 \cdot -\frac{1}{0.1} \exp(-t/0.1). ' Selection.Copy End Sub Sub Macro91() ' ' Macro91 Macro ' Magnetic flux through a coil with NN turns is: ' "&chr(10)&" ' "&chr(10)&" F=?B dA,\Phi = \int B , dA, ' "&chr(10)&" where BB is the magnetic field strength. ' "&chr(10)&" Example: A uniform magnetic field B=0.02 ' Selection.MoveDown Unit:=wdLine, Count:=22

&chr(10)&" Example: A uniform magnetic field B=0.02 Selection.MoveDown Unit:=wdLine, Count:=22 Selection.Copy End Sub Sub Macro92() ' ' Macro92 Macro ' ' "&chr(10)&" A=0.1·0.1=0.01 m2.A = 0.1 \cdot 0.1 = 0.01 , \text{m}^2. ' "&chr(10)&" 2. Flux: ' "&chr(10)&" ' "&chr(10)&" F=B·A=0.02·0.01=2×10-4 Wb.\Phi = B \cdot A = 0.02 \cdot 0.01 = 2 \times 10^{-4} , \text{Wb}. ' Selection.MoveDown Unit:=wdLine, Count:=27 Selection.Copy End Sub Sub Macro93() ' ' Macro93 Macro ' ' "&chr(10)&" Z=R2+(XL-XC)2,XL=2pfL,XC=12pfC.Z = \sqrt{R^2 + \left(X_L - X_C \right)^2}, \quad X_L = 2\pi f L, \quad X_C = \frac{1}{2\pi f C}. ' "&chr(10)&" Example: Find dZdf\frac{dZ}{df} for R=50 OR = 50 , \Omega, L=0.1 HL = 0.1 ' Selection.MoveDown Unit:=wdLine, Count:=23 ActiveWindow.ActivePane.VerticalPercentScrolled = -124 Selection.Copy End Sub Sub Macro94() ' ' Macro94 Macro ' ' "&chr(10)&" Vout(t)=RC·dVindt=(1×103·10×10-6)·10·2pcos?(2pt).V_{out}(t) = RC \cdot \frac{dV_{in}}{dt} = (1 \times 10^3 \cdot 10 \times 10^{-6}) \cdot 10 \cdot 2\pi \cos(2\pi t). ' "&chr(10)&" ' "&chr(10)&" Vout(t)=0.2pcos?(2pt) V.V_{o ' Selection.MoveDown Unit:=wdLine, Count:=19 Selection.Copy End Sub Sub Macro95() ' ' Macro95 Macro ' Vout(t)=1RC?Vin(t) dt.V_{out}(t) = \frac{1}{RC} \int V_{in}(t) , dt. ' "&chr(10)&" Example: For Vin(t)=5t VV_{in}(t) = 5t , \text{V}, find Vout(t)V_{out}(t) with R=2 kOR = 2 , \text{k}\Omega, C=100 µFC = 100 , \mu\text{F}. ' Selection.Copy End Sub Sub Macro96() ' ' Macro96 Macro ' ' "&chr(10)&" 1. Integrate VinV_{in}: ' "&chr(10)&" ' "&chr(10)&" ?Vin(t) dt=?5t dt=5t22.\int V_{in}(t) , dt = \int 5t , dt = \frac{5t^2}{2}. ' "&chr(10)&" 2. Calculate Vout(t)V_{out}(t): ' "&chr(10)&" ' Selection.MoveDown Unit:=wdLine, Count:=23 Selection.Copy End Sub Sub Macro97() ' ' Macro97 Macro ' Rs=Vsupply-VzenerIzener.R_s = \frac{V_{supply} - V_{zener}}{I_{zener}}. ' "&chr(10)&" Power Dissipation in the Zener: ' "&chr(10)&" ' "&chr(10)&" P=Vzener·Izener.P = V_{zener} \cdot I_{zener}. ' "&chr(10)&" Example ' Selection.Copy End Sub Sub Macro98() ' ' Macro98 Macro ' ' "&chr(10)&" 1. Series Resistance: ' "&chr(10)&" ' "&chr(10)&" Rs=15-5.60.05=188 O.R_s = \frac{15 - 5.6}{0.05} = 188 , \Omega. ' "&chr(10)&" 2. Power Dissipation: ' "&chr(10)&" ' "&chr(10)&" P=5.6·0. ' Selection.MoveDown Unit:=wdLine, Count:=28 Selection.Copy End Sub Sub Macro99() ' ' Macro99 Macro ' f0=12pLC.f_0 = \frac{1}{2\pi\sqrt{LC}}. ' "&chr(10)&" Example: For L=5 mHL = 5 , \text{mH} and C=200 µFC = 200 , \mu\text{F}, calculate f0f_0: ' "&chr(10)&" ' "&chr(10)&" f0=12p5×10-3·200×10-6.f_0 = \frac{1}{2\pi\sqrt{5

' Selection.MoveDown Unit:=wdLine, Count:=83 Selection.Copy End Sub Sub Macro100() ' ' Macro100 Macro ' ' "&chr(10)&" Calculate the rate of change of input voltage dVdt\frac{dV}{dt}, capacitance (CC), resistance (RR), and time constant for an RC integrator given: ' "&chr(10)&" · R=2 kOR = 2 , \text{k}\Omega, ' "&chr(10)&" · C=50 µFC = 5 ' Selection.Copy End Sub Sub Macro101() ' ' Macro101 Macro ' 1. Time Constant: ' "&chr(10)&" ' "&chr(10)&" t=RC=2×103·50×10-6=0.1 s.\tau = RC = 2 \times 10^3 \cdot 50 \times 10^{-6} = 0.1 , \text{s}. ' "&chr(10)&" 2. Rate of Change: ' "&chr(10)&" ' "&chr(10)&" dV ' Selection.Copy End Sub Sub Macro102() ' ' Macro102 Macro ' ' "&chr(10)&" Calculation Example: If R=100 OR = 100 , \Omega, L=0.1 HL = 0.1 , \text{H}, and Vin(t)=20sin?(10t)V_{in}(t) = 20 \sin(10t), calculate: ' "&chr(10)&" 1. Time Constant: ' "&chr(10)&" ' "&chr(10)&" t=LR=0.1100=0.0 ' Selection.MoveDown Unit:=wdLine, Count:=29 Selection.Copy End Sub Sub Macro103() ' ' Macro103 Macro ' Analysis Using Complex Numbers: ' "&chr(10)&" In an RLC circuit: ' "&chr(10)&" 1. Impedance: ' "&chr(10)&" ' "&chr(10)&" Z=R+j(XL-XC),XL=?L,XC=1?C.Z = R + j(X_L - X_C), \quad X_L = \omega L, \quad X_C = \frac{1}{\o ' Selection.Copy End Sub Sub Macro104() ' ' Macro104 Macro ' Z=R+j(XL-XC),XL=?L,XC=1?C.Z = R + j(X_L - X_C), \quad X_L = \omega L, \quad X_C = \frac{1}{\omega C}. ' "&chr(10)&" 2. Power Factor: ' "&chr(10)&" ' "&chr(10)&" cos??=R|Z|.\cos\phi = \frac{R}{|Z|}. ' "&chr(10)&" E ' Selection.Copy End Sub Sub Macro105() ' ' Macro105 Macro ' ' "&chr(10)&" Example: ' "&chr(10)&" For R=10 OR = 10 , \Omega, L=0.05 HL = 0.05 , \text{H}, C=20 µFC = 20 , \mu\text{F}, and f=1 kHzf = 1 , \text{kHz}: ' "&chr(10)&" 1. Calculate XLX_L and XCX_C: ' "&chr(10)&" ' Selection.Copy End Sub Sub Macro106() ' ' Macro106 Macro ' ' "&chr(10)&" Z=R2+(XL-XC)2=102+(314-8)2˜306 O.Z = \sqrt{R^2 + (X_L - X_C)^2} = \sqrt{10^2 + (314 - 8)^2} \approx 306 , \Omega. ' "&chr(10)&" Resonance in RLC Circuits ' "&chr(10)&" Key Formulas: ' "&chr(10)&" 1. Resonance Fr ' ActiveWindow.ActivePane.VerticalPercentScrolled = -147 Selection.MoveDown Unit:=wdLine, Count:=1 Selection.Copy End Sub Sub Macro107() ' ' Macro107 Macro ' Industrial Electronics N4 syllabus focuses on building a strong foundation in electrical and electronic principles through key modules like Network Theorems, Alternating Current Theory, Electronic Power Control, and others. Here's a breakdown of the core ' Selection.MoveDown Unit:=wdLine, Count:=31 Selection.Copy End Sub Sub Macro108() ' ' Macro108 Macro ' ' "&chr(10)&" ?Iin=?Iout.\sum I_{\text{in}} = \sum I_{\text{out}}. ' "&chr(10)&" 2. Second Law (Voltage Law): ' "&chr(10)&" o The sum of voltage drops in a closed loop equals the sum of EMFs: ' "&chr(10)&" ' Selection.Copy End Sub Sub Macro109() ' ' Macro109 Macro ' ' "&chr(10)&" ?V=0.\sum V = 0. ' "&chr(10)&" Example: For a loop with V1=10 VV_1 = 10 , \text{V}, R1=2 OR_1 = 2 ,

\Omega, and R2=3 OR_2 = 3 , \Omega: ' "&chr(10)&" 1. Apply Kirchhoff's Voltage Law: ' "&chr(10)&" ' Selection.MoveDown Unit:=wdLine, Count:=20 Selection.Copy End Sub Sub Macro110() ' ' Macro110 Macro ' o Any linear circuit can be simplified to a single voltage source (VthV_{th}) and a series resistance (RthR_{th}). ' "&chr(10)&" 2. Steps: ' "&chr(10)&" o Remove the load. ' "&chr(10)&" o Calculate VthV_{th} across the open t ' Selection.Copy End Sub Sub Macro111() ' ' Macro111 Macro ' o Determine RthR_{th} by deactivating all sources (replace voltage sources with short circuits and current sources with open circuits). ' "&chr(10)&" Example: For a circuit with Vs=12 VV_s = 12 , \text{V}, R1=4 OR_1 = 4 , \Omega, and R2=6 OR_2 ' Selection.MoveDown Unit:=wdLine, Count:=33 Selection.Copy End Sub Sub Macro112() ' ' Macro112 Macro ' Example: For Rth=10 OR_{th} = 10 , \Omega, calculate maximum power if Vth=20 VV_{th} = 20 , \text{V}: ' "&chr(10)&" ' "&chr(10)&" Pmax=Vth24Rth=2024·10=10 W.P_{\text{max}} = \frac{V_{th}^2}{4R_{th}} = \frac{20^2}{4 \cdot 10} = 10 , ' Selection.Copy End Sub Sub Macro113() ' ' Macro113 Macro ' ' "&chr(10)&" Z=R+j(XL-XC),XL=?L,XC=1?C.Z = R + j(X_L - X_C), \quad X_L = \omega L, \quad X_C = \frac{1}{\omega C}. ' "&chr(10)&" · Parallel Circuit: ' "&chr(10)&" ' "&chr(10)&" 1Z=1R2+(1XC-1XL)2.\frac{1}{Z} = \sqrt{\frac{1}{R ' Selection.Copy End Sub Sub Macro114() ' ' Macro114 Macro ' Example: For R=10 OR = 10 , \Omega, L=0.1 HL = 0.1 , \text{H}, C=10 µFC = 10 , \mu\text{F}, and f=50 Hzf = 50 , \text{Hz}: ' "&chr(10)&" 1. Inductive Reactance: ' "&chr(10)&" ' "&chr(10)&" XL=2pfL=2p·50·0.1=31.4 O.X_L = ' Selection.MoveDown Unit:=wdLine, Count:=38 Selection.Copy End Sub Sub Macro115() ' ' Macro115 Macro ' 2. Bandwidth: ' "&chr(10)&" ' "&chr(10)&" BW=frQ,Q=?rLR.BW = \frac{f_r}{Q}, \quad Q = \frac{\omega_r L}{R}. ' "&chr(10)&" Example: For L=0.5 HL = 0.5 , \text{H}, C=20 µFC = 20 , \mu\text{F}, and R=10 OR = 10 , \Omega: ' Selection.Copy End Sub Sub Macro116() ' ' Macro116 Macro ' ' "&chr(10)&" ' "&chr(10)&" fr=12p0.5·20×10-6˜50.33 Hz.f_r = \frac{1}{2\pi\sqrt{0.5 \cdot 20 \times 10^{-6}}} \approx 50.33 , \text{Hz}. ' "&chr(10)&" 2. Quality Factor: ' "&chr(10)&" ' "&chr(10)&" Q=?rLR=2p·50 ' Selection.MoveDown Unit:=wdLine, Count:=59 Selection.Copy End Sub Sub Macro117() ' ' Macro117 Macro ' ' "&chr(10)&" 3.1 Semiconductor Diode ' "&chr(10)&" 1. Diode Equation: ' "&chr(10)&" o Forward current: ' "&chr(10)&" ' "&chr(10)&" I=Is·(eqVkT-1),I = I_s \cdot \left(e^{\frac{qV}{kT}} - 1\right), ' "&chr(10)&" whe ' Selection.Copy End Sub Sub Macro118() ' ' Macro118 Macro ' ' "&chr(10)&" Example Calculation: Given Is=10-12 AI_s = 10^{-12} , \text{A}, V=0.7 VV = 0.7 , \text{V}, T=300 KT = 300 , \text{K}: ' "&chr(10)&" 1. Compute: ' "&chr(10)&" ' "&chr(10)&" I=10-12·(e1.6×10-19·0.71.38×10-23·30 ' Selection.Copy End Sub Sub Macro119() ' ' Macro119 Macro ' ' "&chr(10)&" I=10-12·(e1.6×10-19·0.71.38×10-23·300-1).I = 10^{-12} \cdot \left(e^{\frac{1.6 \times 10^{-19} \cdot 0.7}{1.38 \times 10^{-23} \cdot 300}} - 1\right). ' "&chr(10)&" 2. Result: ' "&chr(10)&" ' "&chr(10)&" I˜0.001 ' Selection.MoveDown Unit:=wdLine, Count:=20 Selection.Copy End Sub Sub Macro120() ' ' Macro120 Macro ' 3.2 Electronic Power Control Devices ' "&chr(10)&" · SCR (Silicon Controlled Rectifier): ' "&chr(10)&" o Conducts when triggered by a gate signal, and blocks when reversed. ' "&chr(10)&" · DIAC: ' "&chr(10)&" o Bidi ' Selection.MoveDown Unit:=wdLine, Count:=35 End Sub Sub Macro121() ' ' Macro121 Macro ' Transformer Ratios: ' "&chr(10)&" · Voltage Ratio: ' "&chr(10)&" ' "&chr(10)&" Vs=Vp·NsNp.V_s = V_p \cdot \frac{N_s}{N_p}. ' "&chr(10)&" · Current Ratio: ' "&chr(10)&" ' "&chr(10)&" Is=Ip·NpNs. ' Selection.Copy End Sub Sub Macro122() ' ' Macro122 Macro ' ' "&chr(10)&" Is=Ip·NpNs.I_s = I_p \cdot \frac{N_p}{N_s}. ' "&chr(10)&" Example Calculation: Given Np=300N_p = 300, Ns=100N_s = 100, and Vp=240 V RMSV_p = 240 , \text{V RMS}: ' "&chr(10)&" 1. Secondary Voltage: ' "&chr(10)&" ' Selection.Copy End Sub Sub Macro123() ' ' Macro123 Macro ' RF=(VACVDC)2-1.RF = \sqrt{\left(\frac{V_{AC}}{V_{DC}}\right)^2 - 1}. ' "&chr(10)&" 2. Full-Wave Rectifier: ' "&chr(10)&" o Utilizes both cycles, reducing ripple. ' "&chr(10)&" Efficiency: ' "&chr(10)&" ' Selection.Copy End Sub Sub Macro124() ' ' Macro124 Macro ' ' "&chr(10)&" ' "&chr(10)&" ?=PDCPAC.\eta = \frac{P_{DC}}{P_{AC}}. ' "&chr(10)&" Module 5: Amplifiers ' "&chr(10)&" Transistor Amplifier Configurations ' "&chr(10)&" 1. Common Emitter (CE): ' "&chr(10)&" ' Selection.Copy End Sub Sub Macro125() ' ' Macro125 Macro ' ' "&chr(10)&" 1. AM Signal Equation: ' "&chr(10)&" ' "&chr(10)&" m(t)=Ac(1+macos??mt)cos??ct,m(t) = A_c(1 + m_a \cos \omega_m t) \cos \omega_c t, ' "&chr(10)&" where mam_a: modulation index, AcA_c: carrier amplitude, ?c\ome ' Selection.Copy End Sub Sub Macro126() ' ' Macro126 Macro ' ' "&chr(10)&" 2. FM Signal Equation: ' "&chr(10)&" ' "&chr(10)&" f(t)=cos?(?ct+ßsin??mt),f(t) = \cos (\omega_c t + \beta \sin \omega_m t), ' "&chr(10)&" where ß\beta: modulation index. ' Selection.Copy End Sub Sub Macro127() ' ' Macro127 Macro ' · Demodulation: ' "&chr(10)&" o Reverse process to recover original information from modulated signals. ' "&chr(10)&" o Methods include envelope detection (AM) and phase-lock loops (FM). ' "&chr(10)&" 2. Antenna Systems ' Selection.MoveDown Unit:=wdLine, Count:=89 Selection.Copy End Sub Sub Macro128() ' ' Macro128 Macro ' Advanced Calculations in Signal Modulation ' "&chr(10)&" 1. Amplitude

Modulation (AM): ' "&chr(10)&" The transmitted AM signal is given by: ' "&chr(10)&" ' "&chr(10)&" m(t)=Ac[1+macos?(?mt)]cos?(?ct),m(t) = A_c [1 ' Selection.MoveDown Unit:=wdLine, Count:=27 Selection.Copy End Sub Sub Macro129() ' ' Macro129 Macro ' ' "&chr(10)&" · mam_a: Modulation index, calculated as ma=AmAcm_a = \frac{A_m}{A_c}, ' "&chr(10)&" · ?c=2pfc\omega_c = 2\pi f_c: Carrier angular frequency, ' "&chr(10)&" · ?m=2pfm\omega_m = 2\pi f_m: Message angular frequency. ' Selection.Copy End Sub Sub Macro130() ' ' Macro130 Macro ' ' "&chr(10)&" Example Calculation: For Ac=5 VA_c = 5 , \text{V}, Am=2 VA_m = 2 , \text{V}, fc=100 kHzf_c = 100 , \text{kHz}, fm=1 kHzf_m = 1 , \text{kHz}: ' "&chr(10)&" 1. Modulation Index: ' "&chr(10)&" ' "&chr(10)&" ma=AmAc=25 ' Selection.Copy End Sub Sub Macro131() ' ' Macro131 Macro ' 2. AM Signal Equation: ' "&chr(10)&" ' "&chr(10)&" m(t)=5[1+0.4cos?(2p·1000t)]cos?(2p·100000t).m(t) = 5 [1 + 0.4 \cos(2\pi \cdot 1000 t)] \cos(2\pi \cdot 100000 t). ' "&chr(10)&" 2. Frequency Modulation (FM): ' Selection.Copy End Sub Sub Macro132() ' ' Macro132 Macro ' ' "&chr(10)&" Example Calculation: For ?f=5 kHz\Delta f = 5 , \text{kHz}, fm=1 kHzf_m = 1 , \text{kHz}, and Ac=10 VA_c = 10 , \text{V}: ' "&chr(10)&" 1. Modulation Index: ' "&chr(10)&" ' "&chr(10)&" ß=?ffm=50001000=5.\b ' ActiveWindow.ActivePane.VerticalPercentScrolled = -173 Selection.Copy End Sub Sub Macro133() ' ' Macro133 Macro ' o Testing electrical wiring. ' "&chr(10)&" o Fault-finding in electrical machines. ' "&chr(10)&" o Renewable energy system maintenance. ' "&chr(10)&" 5. Practical Career Applications ' "&chr(10)&" · Learners apply s ' ActiveWindow.ActivePane.VerticalPercentScrolled = -173 Selection.Copy End Sub Sub Macro134() ' ' Macro134 Macro ' ' "&chr(10)&" Key Role: Integrals help analyze energy storage, system behavior over time, and power distribution in circuits. ' "&chr(10)&" · Energy Stored in Capacitors: $$ E = \frac{1}{2} C V^2 $$ Example: For a capacitor with C=10µFC = 10 \m ' Selection.Copy End Sub Sub Macro135() ' ' Macro135 Macro ' ' "&chr(10)&" · Total Energy in a Time Period (AC Systems): Calculate energy consumption using: $$ E = \int P(t) , dt $$ ' "&chr(10)&" 2. Derivative Calc ' Selection.Copy End Sub Sub Macro136() ' ' Macro136 Macro ' ' "&chr(10)&" · Induced Voltage in Inductors: Voltage across an inductor is: $$ V(t) = L \frac{di(t)}{dt}. $$ Example: With L=5HL = 5H and i(t)=t2i(t) = t^2: $$ V(t) = 5 \times \frac{d(t^2)}{dt} = 10t. $$ At (t = 2s, V(2) = 10 \times 2 = 20V. $$ ' Selection.MoveDown Unit:=wdLine, Count:=102 Selection.Copy End Sub Sub Macro137() ' ' Macro137 Macro ' ' "&chr(10)&" · Resistance Testing: ' "&chr(10)&" o Verifying earth resistance must ensure values below 2 O, calculated using Ohm's law: $$ R = \frac{V}{I} $$ ' "&chr(10)&" · Insulation Resistance: ' "&chr(10)&" o This should exceed ' End Sub Sub Macro138() ' ' Macro138 Macro ' ' "&chr(10)&" o Verifying earth resistance must ensure values below 2 O, calculated using Ohm's law: $$ R = \frac{V}{I} $$ ' "&chr(10)&" · Insulation Resistance: ' "&chr(10)&" o This should exceed 1 MO, confirming isolation standards ' Selection.MoveDown Unit:=wdLine, Count:=57 End Sub

UserForm1 - 1 Private Sub Label1_Click() End Sub Private Sub Label4_Click() End Sub Private Sub Label5_Click() End Sub Private Sub Label6_Click() End Sub Private Sub Label7_Click() End Sub Private Sub Label8_Click() End Sub Private Sub Label9_Click() End Sub Private Sub ListBox1_Click() End Sub Private Sub MultiPage1_Change() End Sub Private Sub MultiPage2_Change() End Sub Private Sub ScrollBar1_Change() End Sub Private Sub SpinButton1_Change() End Sub Private Sub TabStrip1_Change() End Sub Private Sub TextBox1_Change() End Sub Private Sub TextBox10_Change() End Sub Private Sub TextBox12_Change() End Sub Private Sub TextBox14_Change() End Sub Private Sub TextBox15_Change() End Sub Private Sub TextBox16_Change()UserForm1 - 2 End Sub Private Sub TextBox2_Change() End Sub Private Sub TextBox4_Change() End Sub Private Sub TextBox6_Change() End Sub Private Sub TextBox7_Change() End Sub Private Sub TextBox9_Change() End Sub Private Sub ToggleButton1_Click() End Sub Private Sub UserForm_Activate() End Sub Private Sub UserForm_AddControl(ByVal Control As MSForms.Control) End Sub Private Sub UserForm_BeforeDropOrPaste(ByVal Cancel As MSForms.ReturnBoolean, ByVal Control As MSForms .Control, ByVal Action As MSForms.fmAction, ByVal Data As MSForms.DataObject, ByVal X As Single, ByVal Y As Single, ByVal Effect As MSForms.ReturnEffect, ByVal Shift As Integer) End Sub Private Sub UserForm_Click() End Sub Private Sub UserForm_DblClick(ByVal Cancel As MSForms.ReturnBoolean) End Sub Private Sub UserForm_Error(ByVal Number As Integer, ByVal Description As MSForms.ReturnString, ByVal S Code As Long, ByVal Source As String, ByVal HelpFile As String, ByVal HelpContext As Long, ByVal Cance lDisplay As MSForms.ReturnBoolean) End Sub Private Sub UserForm_Initialize() End Sub Private Sub UserForm_KeyUp(ByVal KeyCode As MSForms.ReturnInteger, ByVal Shift As Integer) End Sub Private Sub UserForm_MouseMove(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByV al Y As Single) End Sub Private Sub UserForm_MouseUp(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single,

ByVal Y As Single) End SubUserForm1 - 3 Private Sub UserForm_Resize() End Sub Private Sub UserForm_Scroll(ByVal ActionX As MSForms.fmScrollAction, ByVal ActionY As MSForms.fmScroll Action, ByVal RequestDx As Single, ByVal RequestDy As Single, ByVal ActualDx As MSForms.ReturnSingle, ByVal ActualDy As MSForms.ReturnSingle) End Sub Private Sub UserForm_Terminate() End Subregister academic national trade module class subject course /enginering studie intelligence artificial , expercomputer register trade theory engineering artificial intelligent counter subject time tablrealt matter system subject mathematic subject electrical trade theory subject industrial eletronics subject engineering science subject fault find "txt_labell 2"=true txt_labell 2"=true txt_labell 2"=true txt_labell 2"=true txt_labell 2"=true subject electrotechnology subject control system subject installer rules subject electrotechnic subject power machine txt_labell 2"=true txt_labell 2"=true subject orientation industria , supervision , txt_labell 2"=true subject manangement system learner policy txt_labell 2"=true txt_labell 2"=true subject learner total assessment mark total , time marksheet Che ok cancell next Page1 Page2 ToggleButto n1 VERSION 5.00 Begin {C62A69F0-16DC-11CE-9E98-00AA00574A4F} UserForm1 Caption = "UserForm1" ClientHeight = 9792 ClientLeft = 108 ClientTop = 456 ClientWidth = 20004 OleObjectBlob = "UserForm computer register trade theory engineering artificial intelligent counter subject time tablreal.frx":0000 StartUpPosition = 1 'CenterOwner WhatsThisButton = -1 'True WhatsThisHelp = -1 'True End Attribute VB_Name = "UserForm1" Attribute VB_GlobalNameSpace = False Attribute VB_Creatable = False Attribute VB_PredeclaredId = True Attribute VB_Exposed = False Private Sub Label1_Click()

End Sub

Private Sub Label4_Click()

End Sub

Private Sub Label5_Click()

End Sub

Private Sub Label6_Click()

End Sub

Private Sub Label7_Click()

End Sub

Private Sub Label8_Click()

End Sub

Private Sub Label9_Click()

End Sub

Private Sub ListBox1_Click()

End Sub

Private Sub MultiPage1_Change()

End Sub

Private Sub MultiPage2_Change()

End Sub

Private Sub ScrollBar1_Change()

End Sub

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Private Sub SpinButton1_Change()

End Sub

Private Sub TabStrip1_Change()

End Sub

Private Sub TextBox1_Change()

End Sub

Private Sub TextBox10_Change()

End Sub

Private Sub TextBox12_Change()

End Sub

Private Sub TextBox14_Change()

End Sub

Private Sub TextBox15_Change()

End Sub

Private Sub TextBox16_Change()

End Sub

Private Sub TextBox2_Change()

End Sub

Private Sub TextBox4_Change()

End Sub

Private Sub TextBox6_Change()

End Sub

Private Sub TextBox7_Change()

End Sub

Private Sub TextBox9_Change()

End Sub

Private Sub ToggleButton1_Click()

End Sub

Private Sub UserForm_Activate()

End Sub

Private Sub UserForm_AddControl(ByVal Control As MSForms.Control)

End Sub
```

Private Sub UserForm_BeforeDropOrPaste(ByVal Cancel As MSForms.ReturnBoolean, ByVal Control As MSForms.Control, ByVal Action As MSForms.fmAction, ByVal Data As MSForms.DataObject, ByVal X As Single, ByVal Y As Single, ByVal Effect As MSForms.ReturnEffect, ByVal Shift As Integer)

End Sub

Private Sub UserForm_Click()

End Sub

Private Sub UserForm_DblClick(ByVal Cancel As MSForms.ReturnBoolean)

End Sub

Private Sub UserForm_Error(ByVal Number As Integer, ByVal Description As MSForms.ReturnString, ByVal SCode As Long, ByVal Source As String, ByVal HelpFile As String, ByVal HelpContext As Long, ByVal CancelDisplay As MSForms.ReturnBoolean)

End Sub

Private Sub UserForm_Initialize()

End Sub

Private Sub UserForm_KeyUp(ByVal KeyCode As MSForms.ReturnInteger, ByVal Shift As Integer)

End Sub

Private Sub UserForm_MouseMove(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByVal Y As Single)

End Sub

Private Sub UserForm_MouseUp(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByVal Y As Single)

End Sub

Private Sub UserForm_Resize()

End Sub

Private Sub UserForm_Scroll(ByVal ActionX As MSForms.fmScrollAction, ByVal ActionY As MSForms.fmScrollAction, ByVal RequestDx As Single, ByVal RequestDy As Single, ByVal ActualDx As MSForms.ReturnSingle, ByVal ActualDy As MSForms.ReturnSingle)

End Sub

Private Sub UserForm_Terminate()

End Sub

Sub Macro2() ' ' Macro2 Macro ' current (I=dQdtI = \frac{dQ}{dt}), where the derivative of charge with respect to time gives the current. ' "&chr(10)&" · Integral Function (?f(x,y)dx\int f(x, y) dx): ' End Sub Sub Macro3() ' ' Macro3 Macro ' · Integral Function (?f(x,y)dx\int f(x, y) dx): ' End Sub Sub Macro4() ' ' Macro4 Macro ' Calculating the total energy in a capacitor (W=?V dQW = \int V , dQ) or the area under the voltage-time graph for evaluating work done. ' End Sub Sub Macro5() ' ' Macro5 Macro ' : $W = \int_0^Q V, dQ$ ' "&chr(10)&" § Here, WW represents the energy stored, VV is voltage, and QQ is charge. Integration helps calculate the energy based on the charge distribution. ' "&chr(10)&" o Inductors: $$V = L \frac{dI}{dt ' End Sub Sub Macro6() ' ' Macro6 Macro ' Rate of Change in Current: $I = \frac{dQ}{dt}$ ' "&chr(10)&" § This derivative links the charge

flowing through a conductor over time to the current. ' "&chr(10)&" o Voltage in Changing Magnetic Fields (Faraday's Law): $$\mathcal{E} ' End Sub Sub Macro7() ' ' Macro7 Macro ' 1. Junior-Level Focus: ' "&chr(10)&" o Electrical Trade Theory (N1-N3): ' "&chr(10)&" § Covers foundational concepts like safety precautions, DC theory, conductors, and wiring systems. ' "&chr(10)&" § Practical applications i ' End Sub Sub Macro8() ' ' Macro8 Macro ' 1. Voltage Across a Capacitor: $V(t) = \frac{1}{C}\int i(t), dt + V_0$ ' "&chr(10)&" o Application: Determines voltage V(t)V(t) across a capacitor, where i(t)i(t) is the current, CC is capacitance, and V0V_0 is the initial voltage. ' End Sub Sub Macro9() ' ' Macro9 Macro ' 2. Total Energy Stored in an Inductor: $E = \frac{1}{2} L \int i^2(t), dt$ ' "&chr(10)&" o Application: Calculates energy in an inductor, where LL is inductance and i(t)i(t) is current. '

' End Sub Sub Macro10() ' ' Macro10 Macro ' 3. Charge in a Circuit: $Q = \int I(t), dt$ ' "&chr(10)&" o Application: Finds the total electric charge QQ flowing through a circuit over time, based on current I(t)I(t). ' End Sub Sub Macro11() ' ' Macro11 Macro ' 1. Current in a Capacitor: $I(t) = C \frac{dV(t)}{dt}$ ' "&chr(10)&" o Application: Relates the rate of change of voltage to the current flowing through a capacitor. ' "&chr(10)&" 2. Electromotive Force (Faraday's Law): $$\mathcal{E} ' End Sub Sub Macro12() ' ' Macro12 Macro ' Circuit Analysis: ' "&chr(10)&" o Use integrals and derivatives to analyze RLC circuits and measure power dissipation. ' "&chr(10)&" · Measuring Instruments: ' "&chr(10)&" o Apply calculus to calibrate and interpret readings ' End Sub Sub Macro13() ' ' Macro13 Macro ' Circuit Analysis: ' "&chr(10)&" o Use integrals and derivatives to analyze RLC circuits and measure power dissipation. ' "&chr(10)&" · Measuring Instruments: ' "&chr(10)&" o Apply calculus to calibrate and interpret readings ' End Sub Sub Macro14() ' ' Macro14 Macro ' 1. Junior-Level Roles: Maintenance technician, soldering specialist, or assistant in electrical installations. ' "&chr(10)&" 2. Senior-Level Roles: Electrical engineer, system designer, or project manager overseeing large-scale installations and ' End Sub Sub Macro1() ' ' Macro1 Macro ' · Derivative Function (f'(x, y)): ' "&chr(10)&" o Derivatives measure the rate of change of a function, essential for analyzing varying electrical quantities like current (I), voltage (V), and resistance (R). ' "&chr(10)&" o Example in '

End Sub Sub Macro15() ' ' Macro15 Macro ' ?f(x)g'(x)dx=f(x)g(x)-?g(x)f'(x)dx.\int f(x) g'(x) dx = f(x) g(x) - \int g(x) f'(x) dx. ' "&chr(10)&" · Example: Integrate ?xexdx\int x e^x dx: ' "&chr(10)&" 1. Set f(x)=xf(x) = x and g'(x)=exg'(x) = e^x. ' End Sub Sub Macro16() ' ' Macro16 Macro ' ' "&chr(10)&" f'(x)=1,g(x)=ex.f'(x) = 1, \quad g(x) = e^x. ' "&chr(10)&" 3. Apply the formula: ' "&chr(10)&" ' "&chr(10)&" ?xexdx=xex-?exdx=xex-ex+C.\int x e^x dx = x e^x - \int e^x dx = x e^x - e^x + C. ' Selection.MoveDown Unit:=wdLine, Count:=19 End Sub Sub Macro17() ' ' Macro17 Macro ' ' "&chr(10)&" f'(x)=1,g(x)=ex.f'(x) = 1, \quad g(x) = e^x. ' "&chr(10)&" 3. Apply the formula: ' "&chr(10)&" ' "&chr(10)&" ?xexdx=xex-?exdx=xex-ex+C.\int x e^x dx = x e^x - \int e^x dx = x e^x - e^x + C. ' End Sub Sub Macro18() ' ' Macro18 Macro ' ' "&chr(10)&" ?sin?2(x)dx=?12dx-?cos?(2x)2dx=x2-sin?(2x)4+C.\int \sin^2(x) dx = \int \frac{1}{2} dx - \int \frac{\cos(2x)}{2} dx = \frac{x}{2} - \frac{\sin(2x)}{4} + C. ' "&chr(10)&" 3. Completing the Square: ' "&chr(10)&" o Transform qu ' End Sub Sub Macro19() ' ' Macro19 Macro ' ' "&chr(10)&" o Example: Integrate ?1x2+6x+10dx\int \frac{1}{x^2 + 6x + 10} dx. ' "&chr(10)&" § Complete the square: x2+6x+10=(x+3)2+1x^2 + 6x + 10 = (x + 3)^2 + 1. ' "&chr(10)&" § Use the formula for inverse tangent: ' "&chr(10)&" ' End Sub Sub Macro20() ' ' Macro20 Macro ' ' "&chr(10)&" 2(x+3)3?Ax+3+B(x+3)2+C(x+3)3.\frac{2}{(x+3)^3} \to \frac{A}{x+3} + \frac{B}{(x+3)^2} + \frac{C}{(x+3)^3}. ' "&chr(10)&" · Case 2: Two Recursive Factors: ' "&chr(10)&" ' "&chr(10)&" 5x(x-1)2(2x-5)?A(x-1)+B(x-1)2+C ' End Sub Sub Macro21() ' ' Macro21 Macro ' 5x(x-1)2(2x-5)?A(x-1)+B(x-1)2+C(2x-5).\frac{5x}{(x-1)^2 (2x-5)} \to \frac{A}{(x-1)} + \frac{B}{(x-1)^2} + \frac{C}{(2x-5)}. ' End Sub Sub Macro22() ' ' Macro22 Macro ' 5x(x-1)2(2x-5)?A(x-1)+B(x-1)2+C(2x-5).\frac{5x}{(x-1)^2 (2x-5)} \to \frac{A}{(x-1)} + \frac{B}{(x-1)^2} + \frac{C}{(2x-5)}. ' End Sub Sub Macro23() ' ' Macro23 Macro ' ' "&chr(10)&" A=?01[(x+2)-x2]dx=?01(-x2+x+2)dx.A = \int_0^1 [(x+2) - x^2] dx = \int_0^1 (-x^2 + x + 2) dx. ' "&chr(10)&" Compute: ' "&chr(10)&" ' "&chr(10)&" ?01(-x2+x+2)dx=[-x33+x22+2x]01=-13+12+2=136.\int_0^1 (-x^2 + x + 2) ' End Sub Sub Macro24() ' ' Macro24 Macro ' ' "&chr(10)&" V=p?ab[f(x)]2dx.V = \pi \int_a^b [f(x)]^2 dx. ' "&chr(10)&" · Shell Method: ' "&chr(10)&" ' "&chr(10)&" V=2p?abxf(x)dx.V = 2\pi \int_a^b x f(x) dx. '

' End Sub Sub Macro25() ' ' Macro25 Macro ' 1. Formula: ' "&chr(10)&" [V = \pi \int_0^1 (x)2 dx = \pi \int_0^1 x^4 dx.] ' "&chr(10)&" 2. Compute: ' "&chr(10)&" [V = \pi \left[\frac{x5}{5}\right]*01 = \frac{\pi}{5}.] ' *End Sub Sub Macro26()* ' ' *Macro26 Macro* ' *x2=4-x2 ? 2x2=4 ? x=±2.x^2 = 4 - x^2 \implies 2x^2 = 4 \implies x = \pm\sqrt{2}.* ' *"&chr(10)&" Intersection points are (2,2)(\sqrt{2}, 2) and (-2,2)(-\sqrt{2}, 2).* ' *End Sub Sub Macro27() ' ' Macro27 Macro ' ' "&chr(10)&" A=?-22[(4-x2)-x2]dx=?-22(4-2x2)dx.A = \int{-\sqrt{2}}^{\sqrt{2}}*

[(4 - x^2) - x^2] dx = \int_{-\sqrt{2}}^{\sqrt{2}} (4 - 2x^2) dx. ' "&chr(10)&" Compute: ' "&chr(10)&" [A = [4x - \frac{2x3}{3}]_{-\sqrt{2}}{

' End Sub Sub Macro28() ' ' Macro28 Macro ' ' "&chr(10)&" x¯=?abx[f(x)-g(x)]dx?ab[f(x)-g(x)]dx.\bar{x} = \frac{\int_a^b x [f(x) - g(x)] dx}{\int_a^b [f(x) - g(x)] dx}. ' "&chr(10)&" · Example: For y=x2y = x^2, find x¯\bar{x} over [0,1][0, 1]: ' "&chr(10)&" ' "&chr(10)&" ' End Sub Sub Macro29() Attribute Macro29.VB_Description = "Compute numerator: \r\n \r\n ?01x3dx=x44|01=14.\int_0^1 x^3 dx = \frac{x^4}{4} \big|_0^1 = \frac{1}{4}. \r\n Compute denominator: \r\n _ \r\n ?01x2dx=x33|01=13." ' ' Macro29 Macro ' Compute numerator: ' "&chr(10)&" ' "&chr(10)&" ?01x3dx=x44|01=14.\int_0^1 x^3 dx = \frac{x^4}{4} \big|_0^1 = \frac{1}{4}. ' "&chr(10)&" Compute denominator: ' "&chr(10)&" ' "&chr(10)&" ?01x2dx=x33|01=13. ' End Sub Sub Macro30() Attribute Macro30.VB_Description = " \r\n Ix=?ab[f(x)]2dx.I_x = \int_a^b [f(x)]^2 dx. \r\n 2. Moment of Inertia: \r\n o For solids: \r\n \r\n I=?abx2[f(x)]dx.I = \int_a^b x^2 [f(x)] dx. _ \r\n" ' ' Macro30 Macro ' ' "&chr(10)&" Ix=?ab[f(x)]2dx.I_x = \int_a^b [f(x)]^2 dx. ' "&chr(10)&" 2. Moment of Inertia: ' "&chr(10)&" o For solids: ' "&chr(10)&" ' "&chr(10)&" I=?abx2[f(x)]dx.I = \int_a^b x^2 [f(x)] dx. '

' End Sub Sub Macro31() ' ' Macro31 Macro ' : Find the area between y=x2y = x^2 and y=4-x2y = 4 - x^2 over x=-2x = -\sqrt{2} to x=2x = \sqrt{2}: ' "&chr(10)&" ' "&chr(10)&" A=?-22[(4-x2)-x2]dx=?-22(4-2x2)dx.A = \int_{-\sqrt{2}}^{\sqrt{2}} [(4 - x^2) - x^2] dx = \int_{-\sqrt{2}} ' End Sub Sub Macro32() ' ' Macro32 Macro ' Polar form representation (modulus r=x2+y2r = \sqrt{x^2 + y^2} and argument ?=tan?-1(y/x)\theta = \tan^{-1}(y/x)) is crucial for simplifying multiplications and divisions. ' End Sub Sub Macro33() ' ' Macro33 Macro ' o Formula: D=ad-bcD = ad - bc. ' "&chr(10)&" o Example Calculation: If D=[63-23]D = \begin{bmatrix} 6 & 3 \ -2 & 3 \end{bmatrix}, then: ' "&chr(10)&" ' "&chr(10)&" D=(6·3)-(3·-2)=18+6=24.D = (6 \cdot 3) - (3 \cdot -2) = 18 ' Selection.MoveDown Unit:=wdLine, Count:=22 End Sub Sub Macro34() ' ' Macro34 Macro ' D=[abcdefghi],D = \begin{bmatrix} a & b & c \ d & e & f \ g & h & i \end{bmatrix}, ' "&chr(10)&" the determinant is: ' "&chr(10)&" ' "&chr(10)&" D=a(ei-fh)-b(di-fg)+c(dh-eg).D = a(ei - fh) - b(di - fg) + c(dh - eg). ' End Sub Sub Macro35() ' ' Macro35 Macro ' D=[abcdefghi],D = \begin{bmatrix} a & b & c \ d & e & f \ g & h & i \end{bmatrix}, ' "&chr(10)&" the determinant is: ' "&chr(10)&" ' "&chr(10)&" D=a(ei-fh)-b(di-fg)+c(dh-eg).D = a(ei - fh) - b(di - fg) + c(dh - eg). ' End Sub Sub Macro36() ' ' Macro36 Macro ' ' "&chr(10)&" o Using conjugates, divide (3+2i)(3 + 2i) by (1-i)(1 - i): Multiply numerator and denominator by (1+i)(1 + i): ' "&chr(10)&" [\frac{(3+2i)}{(1-i)} = \frac{(3+2i)(1+i)}{(1-i)(1+i)} = \frac{3+3i+2i+2i2}{1+12} = \frac{1+5i}{2}.] ' End Sub Sub Macro37() ' ' Macro37 Macro ' ' "&chr(10)&" o Convert z=3+4iz = 3 + 4i: Modulus: r=32+42=5r = \sqrt{3^2 + 4^2} = 5. Argument: ?=tan?-1(43)˜53.1°\theta = \tan^{-1}(\frac{4}{3}) \approx 53.1^\circ. Polar Form: z=5(cos?53.1°+isin?53.1°)z = 5(\cos 53.1^\circ + i\sin 53.1^\circ). ' Selection.MoveDown Unit:=wdLine, Count:=132 Selection.MoveUp Unit:=wdLine, Count:=36 End Sub Sub Macro38() ' ' Macro38 Macro ' ' "&chr(10)&" o Convert z=3+4iz = 3 + 4i: Modulus: r=32+42=5r = \sqrt{3^2 + 4^2} = 5. Argument: ?=tan?-1(43)˜53.1°\theta = \tan^{-1}(\frac{4}{3}) \approx 53.1^\circ. Polar Form: z=5(cos?53.1°+isin?53.1°)z = 5(\cos 53.1^\circ + i\sin 53.1^\circ). ' End Sub Sub Macro39() ' ' Macro39 Macro ' o x3?3x2x^3 \to 3x^2, 5x2?10x5x^2 \to 10x, -x?-1-x \to -1, 7?07 \to 0. ' "&chr(10)&" 2. Result: dydx=3x2+10x-1\frac{dy}{dx} = 3x^2 + 10x - 1. '

' Selection.MoveDown Unit:=wdLine, Count:=31 End Sub Sub Macro40() ' ' Macro40 Macro ' ' "&chr(10)&" (x+y)3=x3+3x2y+3xy2+y3.(x + y)^3 = x^3 + 3x^2y + 3xy^2 + y^3. ' "&chr(10)&" 3. Differentiation from First Principles: ' "&chr(10)&" o Define dydx\frac{dy}{dx} as: ' "&chr(10)&" ' "&chr(10)&" lim?h?0f(x+ ' End Sub Sub Macro41() Attribute Macro41.VB_Description = "o Let u=2xu = 2x, then: \r\n \r\n ddx[sin?(u)]=cos?(u)·dudx. \frac{d}{dx}[\sin(u)] = \cos(u) \cdot \frac{du}{dx}. \r\n Substituting u=2xu = 2x: \r\n _ \r\n ddx[s" ' ' Macro41 Macro ' o Let u=2xu = 2x, then: ' "&chr(10)&" ' "&chr(10)&" ddx[sin?(u)]=cos?(u)·dudx.\frac{d}{dx}[\sin(u)] = \cos(u) \cdot \frac{du}{dx}. ' "&chr(10)&" Substituting u=2xu = 2x: ' "&chr(10)&" ' "&chr(10)&" ddx[s ' Selection.MoveDown Unit:=wdLine, Count:=71 End Sub Sub Macro42() ' ' Macro42 Macro ' o Integrate ?xndx\int x^n dx: ' "&chr(10)&" ' "&chr(10)&" ?xndx=xn+1n+1+C(if n?-1).\int x^n dx = \frac{x^{n+1}}{n+1} + C \quad (\text{if } n \neq -1). ' "&chr(10)&" 2. Trigonometric Integration: ' "&chr(10)&" o Exa ' Selection.MoveDown Unit:=wdLine, Count:=150 End Sub Sub Macro43() ' ' Macro43 Macro ' ' "&chr(10)&" · Power Rule: If f(x)=xnf(x) = x^n, then f'(x)=n·xn-1f'(x) = n \cdot x^{n-1}. Example: f(x)=x3 ? f'(x)=3x2f(x) = x^3 \implies f'(x) = 3x^2. ' "&chr(10)&" · Constant Rule: If f(x)=cf(x) = c, where cc is constant, then f'(x)=0f'(x) = 0. Exam ' End Sub Sub Macro44() ' ' Macro44 Macro ' 2. Advanced Rules ' "&chr(10)&" For more complex functions: ' "&chr(10)&" · Product Rule: If f(x)=u(x)·v(x)f(x) = u(x) \cdot v(x), then f'(x)=u'(x)·v(x)+u(x)·v'(x)f'(x) =

u'(x) \cdot v(x) + u(x) \cdot v'(x). Example: f(x)=x·sin?(x) ? ' End Sub Sub Macro45() ' ' Macro45 Macro ' Real-World Example ' "&chr(10)&" Let’s calculate the derivative of f(x)=3x2+5x+2f(x) = 3x^2 + 5x + 2, representing velocity in an engineering context: ' "&chr(10)&" 1. Differentiate each term: ' "&chr(10)&" o 3x2 ? 6x3x^2 ' Selection.MoveDown Unit:=wdLine, Count:=145 End Sub Sub Macro46() ' ' Macro46 Macro ' o The limit describes the value a function approaches as the input gets close to a specific point. Notation: lim?x? af(x)\lim_{x \to a} f(x). ' "&chr(10)&" o Example: Find lim?x?2(x2-4)\lim_{x \to 2} (x^2 - 4): ' "&chr(10)&" ' End Sub Sub Macro47() ' ' Macro47 Macro ' o Forms like 00\frac{0}{0} are resolved by simplifying the function or applying L’Hôpital’s rule (if allowed). ' "&chr(10)&" 4. Continuity ' "&chr(10)&" 1. Definition: ' "&chr(10)&" o A function f(x)f(x) is continuous at x=a ' End Sub Sub Macro48() ' ' Macro48 Macro ' ' "&chr(10)&" ' "&chr(10)&" x=-4±42-4(2)(-6)2(2)=-4±16+484=-4±644.x = \frac{-4 \pm \sqrt{4^2 - 4(2)(-6)}}{2(2)} = \frac{-4 \pm \sqrt{16 + 48}}{4} = \frac{-4 \pm \sqrt{64}}{4}. ' "&chr(10)&" 3. Simplify: ' "&chr(10)&" ' End Sub Sub Macro49() ' ' Macro49 Macro ' ' "&chr(10)&" vr=vA2+vB2=402+302=1600+900=2500=50 km/h.v_r = \sqrt{v_A^2 + v_B^2} = \sqrt{40^2 + 30^2} = \sqrt{1600 + 900} = \sqrt{2500} = 50 , \text{km/h}. ' "&chr(10)&" 2. Shortest Distance: ' "&chr(10)&" o If both cars are moving tow ' Selection.MoveDown Unit:=wdLine, Count:=53 End Sub Sub Macro50() ' ' Macro50 Macro ' A ball is projected horizontally from a height of 5 m5 , \text{m} with an initial velocity of 10 m/s10 , \text{m/s}. Calculate the time of flight and range: ' "&chr(10)&" 1. Time of Flight: Using h=12gt2h = \frac{1}{2} g t^2, solve: ' End Sub Sub Macro51() ' ' Macro51 Macro ' ' "&chr(10)&" 5=12·9.8·t2 ? t=109.8˜1.01 s.5 = \frac{1}{2} \cdot 9.8 \cdot t^2 \implies t = \sqrt{\frac{10}{9.8}} \approx 1.01 , \text{s}. ' "&chr(10)&" 2. Range: Horizontal distance: x=v·tx = v \cdot t: ' "&chr(10)&" ' End Sub Sub Macro52() ' ' Macro52 Macro ' A wheel rotates at 10 rad/s10 , \text{rad/s} with an angular acceleration of 2 rad/s22 , \text{rad/s}^2. Find the angular displacement after 5 s5 , \text{s}: ' "&chr(10)&" 1. Use: ' "&chr(10)&" ' "&chr(10)&" ?=?t+12at2.\t ' Selection.MoveDown Unit:=wdLine, Count:=26 End Sub Sub Macro53() ' ' Macro53 Macro ' F=ma=1000·2=2000 N.F = ma = 1000 \cdot 2 = 2000 , \text{N}. ' Selection.MoveDown Unit:=wdLine, Count:=35 End Sub Sub Macro54() ' ' Macro54 Macro ' F=ma=1000·2=2000 N.F = ma = 1000 \cdot 2 = 2000 , \text{N}. ' Selection.MoveDown Unit:=wdLine, Count:=27 End Sub Sub Macro55() ' ' Macro55 Macro ' 1. Use F=P·AF = P \cdot A: ' "&chr(10)&" ' "&chr(10)&" A=p·(0.52)2=0.196 m2,A = \pi \cdot \left(\frac{0.5}{2}\right)^2 = 0.196 , \text{m}^2, ' "&chr(10)&" ' "&chr(10)&" F=500·0.196=98.1 kN.F = 500 \cdot 0.196 = 9 ' Selection.MoveDown Unit:=wdLine, Count:=27 End Sub Sub Macro56() ' ' Macro56 Macro ' Example: A steel rod with L=2 mL = 2 , \text{m} and cross-sectional area A=0.01 m2A = 0.01 , \text{m}^2 stretches by ?L=0.002 m\Delta L = 0.002 , \text{m}. Find the stress if E=2·105 MPaE = 2 \cdot 10^5 , \text{MPa}: ' "&chr(10)&" 1. Strain: ' End Sub Sub Macro57() ' ' Macro57 Macro ' 2. Stress: ' "&chr(10)&" ' "&chr(10)&" s=E·?=2·105·0.001=200 MPa.\sigma = E \cdot \epsilon = 2 \cdot 10^5 \cdot 0.001 = 200 , \text{MPa}. '

' End Sub Sub Macro58() ' ' Macro58 Macro ' A gas at 1 atm1 , \text{atm} and 300 K300 , \text{K} has a volume 2 m32 , \text{m}^3. Find its final volume if the pressure is halved: ' "&chr(10)&" 1. Using Boyle’s Law (P1V1=P2V2P_1 V_1 = P_2 V_2): ' "&chr(10)&" ' Selection.MoveDown Unit:=wdLine, Count:=32 End Sub Sub Macro59() ' ' Macro59 Macro ' A gas at 1 atm1 , \text{atm} and 300 K300 , \text{K} has a volume 2 m32 , \text{m}^3. Find its final volume if the pressure is halved: ' "&chr(10)&" 1. Using Boyle’s Law (P1V1=P2V2P_1 V_1 = P_2 V_2): ' "&chr(10)&" ' Selection.MoveDown Unit:=wdLine, Count:=24 End Sub Sub Macro60() Attribute Macro60.VB_Description = "1. Angular Velocity: \r\n \r\n ?=at=4·3=12 rad/s.\omega = \alpha t = 4 \cdot 3 = 12 \, \text{rad/s}. \r\n 2. Work Done: \r\n _ \r\n W=12I?2=12·2·122=144 J.W = \" ' ' Macro60 Macro ' 1. Angular Velocity: ' "&chr(10)&" ' "&chr(10)&" ?=at=4·3=12 rad/s.\omega = \alpha t = 4 \cdot 3 = 12 , \text{rad/s}. ' "&chr(10)&" 2. Work Done: ' "&chr(10)&" ' "&chr(10)&" W=12I?2=12·2·122=144 J.W = ' End Sub Sub Macro61() ' ' Macro61 Macro ' ' "&chr(10)&" P=Q·?P?,P = \frac{Q \cdot \Delta P}{\eta}, ' "&chr(10)&" where Q=0.5/60 m3/sQ = 0.5/60 , \text{m}^3/\text{s}, ?P=2×106 Pa\Delta P = 2 \times 10^6 , \text{Pa}, and assume ?=0.85\eta = 0.85: ' "&chr(10)&" ' End Sub Sub Macro62() ' ' Macro62 Macro ' ' "&chr(10)&" A=p·(0.025)2=1.96×10-3 m2.A = \pi \cdot (0.025)^2 = 1.96 \times 10^{-3} , \text{m}^2. ' "&chr(10)&" 2. Stress: ' "&chr(10)&" ' "&chr(10)&" s=FA=800001.96×10-3˜4.08×107 Pa.\sigma = \frac{F}{A} = \frac{80000}{1.96 ' End Sub Sub Macro63() ' ' Macro63 Macro ' Advanced Example: A gas undergoes an isothermal expansion from P1=3 atm,V1=2 m3P_1 = 3 , \text{atm}, V_1 = 2 , \text{m}^3 to V2=5 m3V_2 = 5 , \text{m}^3. Calculate the work done: ' "&chr(10)&" ' "&chr(10)&" W=P1V1ln?(V2V1),W = P_1 ' Selection.MoveDown Unit:=wdLine, Count:=173 End Sub Sub Macro64() ' ' Macro64 Macro ' Z=R2+(XL-XC)2,Z

= \sqrt{R^2 + (X_L - X_C)^2}, " &chr(10)&" where XL=2pfLX_L = 2\pi fL and XC=12pfCX_C = \frac{1}{2\pi fC}. " &chr(10)&" · Use phasor diagrams to analyze voltage and current relationships. ' "&chr(10)&" · Pow ' End Sub Sub Macro65() ' ' Macro65 Macro ' o Resistance (RR) = 10 O10 , \Omega, ' "&chr(10)&" o Inductive Reactance (XLX_L) = 15 O15 , \Omega, ' "&chr(10)&" o Capacitive Reactance (XCX_C) = 5 O5 , \Omega: ' "&chr(10)&" ' "&chr(10)&" Z=R2+(XL-XC)2=102+(15 ' End Sub Sub Macro66() ' ' Macro66 Macro ' ' "&chr(10)&" Z=R2+(XL-XC)2=102+(15-5)2=100+100=14.14 O.Z = \sqrt{R^2 + (X_L - X_C)^2} = \sqrt{10^2 + (15 - 5)^2} = \sqrt{100 + 100} = 14.14 , \Omega. ' "&chr(10)&" General Assessment Guidelines ' "&chr(10)&" 1. Practical Applications: ' Selection.MoveDown Unit:=wdLine, Count:=61 End Sub Sub Macro67() ' ' Macro67 Macro ' Z=R2+(XL-XC)2,XL=2pfL,XC=12pfC.Z = \sqrt{R^2 + (X_L - X_C)^2}, \quad X_L = 2\pi fL, \quad X_C = \frac{1}{2\pi fC}. ' "&chr(10)&" 3. Resonance: ' "&chr(10)&" o Achieved when XL=XCX_L = X_C. Use: ' "&chr(10)&" ' Selection.MoveDown Unit:=wdLine, Count:=24 End Sub Sub Macro68() ' ' Macro68 Macro ' ' "&chr(10)&" Example Problem: A convection heater operates with 2 kW2 , \text{kW}. Find the energy used in 5 hours5 , \text{hours}: ' "&chr(10)&" ' "&chr(10)&" E=P·t=2·5=10 kWh.E = P \cdot t = 2 \cdot 5 = 10 , \text{kWh}. ' Selection.MoveDown Unit:=wdLine, Count:=21 End Sub Sub Macro69() ' ' Macro69 Macro ' Example Problem: An LED lamp uses 10 W10 , \text{W} and operates for 4 hours/day4 , \text{hours/day}. Calculate energy consumption in one month: ' "&chr(10)&" ' "&chr(10)&" E=P·t·days=10·4·30=1.2 kWh.E = P \cdot t \cdot \text{days} ' Selection.MoveDown Unit:=wdLine, Count:=28 Selection.MoveUp Unit:=wdLine, Count:=37 Selection.Copy End Sub Sub Macro70() ' ' Macro70 Macro ' Module 4: Programmable Logic Controllers (PLCs) ' "&chr(10)&" Key Topics: ' "&chr(10)&" · Define PLCs, their components, and their programming languages (e.g., ladder logic). ' "&chr(10)&" Practical Insights: PLC applications ' Selection.MoveDown Unit:=wdLine, Count:=23 Selection.Copy End Sub Sub Macro71() Attribute Macro71.VB_Description = " \r\n o Calculate back emf: \r\n \r\n Eb=V-IaRa.E_b = V - I_aR_a. \r\n 2. Motor Torque: \r\n o Use: _ \r\n \r\n T=kIa?.T = k I_a \ph" ' ' Macro71 Macro ' ' "&chr(10)&" o Calculate back emf: ' "&chr(10)&" ' "&chr(10)&" Eb=V-IaRa.E_b = V - I_aR_a. ' "&chr(10)&" 2. Motor Torque: ' "&chr(10)&" o Use: ' "&chr(10)&" ' "&chr(10)&" T=kIa?.T = k I_a \ph ' Selection.MoveDown Unit:=wdLine, Count:=17 Selection.Copy End Sub Sub Macro72() ' ' Macro72 Macro ' Example Problem: Find the torque of a DC motor with Ia=10 AI_a = 10 , \text{A}, ?=0.02 Wb\phi = 0.02 , \text{Wb}, and k=1k = 1: ' "&chr(10)&" ' "&chr(10)&" T=kIa?=1·10·0.02=0.2 Nm.T = k I_a \phi = 1 \cdot 10 \cdot 0.02 = 0.2 , \tex ' Selection.MoveRight Unit:=wdCharacter, Count:=1 Selection.MoveDown Unit:=wdLine, Count:=26 Selection.Copy End Sub Sub Macro73() ' ' Macro73 Macro ' ' "&chr(10)&" S=ns-nrns,ns=120fP.S = \frac{n_s - n_r}{n_s}, \quad n_s = \frac{120f}{P}. ' "&chr(10)&" Example Problem: For a motor with f=50 Hzf = 50 , \text{Hz} and P=4P = 4, calculate synchronous speed: ' "&chr(10)&" ' Selection.MoveDown Unit:=wdLine, Count:=31 Selection.Copy End Sub Sub Macro74() ' ' Macro74 Macro ' ' "&chr(10)&" Example Problem: A transformer has Pcore=200 WP_{core} = 200 , \text{W} and Pcopper=300 WP_{copper} = 300 , \text{W}. Calculate efficiency when delivering Pout=1000 WP_{out} = 1000 , \text{W}: ' "&chr(10)&" ' "&chr(10)&" ? ' Selection.MoveDown Unit:=wdLine, Count:=20 Selection.Copy End Sub Sub Macro75() ' ' Macro75 Macro ' ' "&chr(10)&" · System earthing for safety and fault detection. ' "&chr(10)&" · Earthing networks and neutral conductor importance. ' "&chr(10)&" Practical Insights: Proper earthing prevents hazards such as electric shocks and ensures f ' Selection.MoveDown Unit:=wdLine, Count:=39 Selection.MoveUp Unit:=wdLine, Count:=1 Selection.MoveDown Unit:=wdLine, Count:=25 Selection.Copy End Sub Sub Macro76() ' ' Macro76 Macro ' ' "&chr(10)&" Enhanced Example: A geyser thermostat heats 50 kg50 , \text{kg} of water from 25°C25^\circ \text{C} to 80°C80^\circ \text{C}. Find the energy required if the specific heat capacity of water is 4200 J/kg°C4200 , \text{J/kg}^\circ\text{C}: ' Selection.MoveDown Unit:=wdLine, Count:=22 Selection.Copy End Sub Sub Macro77() ' ' Macro77 Macro ' ' "&chr(10)&" E=50·4200·55=11,550,000 J or 11.55 MJ.E = 50 \cdot 4200 \cdot 55 = 11,550,000 , \text{J} , \text{or} , 11.55 , \text{MJ}. ' "&chr(10)&" Module 3: Lighting Systems ' "&chr(10)&" Expanded Example: A compact f ' Selection.Copy Selection.Copy End Sub Sub Macro78() ' ' Macro78 Macro ' Expanded Example: A compact fluorescent lamp operates at 15 W15 , \text{W} for 10 hours/day10 , \text{hours/day}. Calculate energy consumption for 30 days30 , \text{days}. ' "&chr(10)&" Solution: ' "&chr(10)&" 1. Daily Energy: ' End Sub Sub Macro79() ' ' Macro79 Macro ' Edaily=P·t=15·10=150 Wh.E_{\text{daily}} = P \cdot t = 15 \cdot 10 = 150 , \text{Wh}. ' "&chr(10)&" 2. Monthly Energy: ' "&chr(10)&" ' "&chr(10)&" Emonthly=150·30=4500 Wh=4.5 kWh.E_{\text{monthly}} = 150 \cdot 30 = 4500 , ' Selection.Copy End Sub Sub Macro80() ' ' Macro80 Macro ' Advanced Torque Calculation: A DC motor draws Ia=15 AI_a = 15 , \text{A} with a magnetic flux of ?=0.03 Wb\phi = 0.03 , \text{Wb}. Find the armature torque if k=1.2k = 1.2. ' "&chr(10)&" Solution: ' "&chr(10)&" 1. Torque: ' Selection.Copy End Sub Sub Macro81() ' '

Macro81 Macro ' T=kIa?=1.2·15·0.03=0.54 Nm.T = k I_a \phi = 1.2 \cdot 15 \cdot 0.03 = 0.54 , \text{Nm}. ' "&chr(10)&" Module 6: Alternating Current Machines ' "&chr(10)&" Speed Analysis Example: For a three-phase induction motor with f=60 Hzf = 60 , ' Selection.Copy End Sub Sub Macro82() ' ' Macro82 Macro ' ' "&chr(10)&" ns=120fP=120·604=1800 RPM.n_s = \frac{120f}{P} = \frac{120 \cdot 60}{4} = 1800 , \text{RPM}. ' "&chr(10)&" 2. Rotor Speed: ' "&chr(10)&" ' "&chr(10)&" nr=ns(1-S)=1800(1-0.05)=1710 RPM.n_r = n_s (1 - S) = 1800 (' Selection.MoveDown Unit:=wdLine, Count:=198 Selection.Copy End Sub Sub Macro83() ' ' Macro83 Macro ' Promotional Mark: 40% ICASS + 60% Exam marks (minimum 40% required for exam qualification). ' "&chr(10)&" Exam Setup: ' "&chr(10)&" · Duration: 3 hours. ' "&chr(10)&" · Closed book, formula sheet included. ' Selection.Copy End Sub Sub Macro84() ' ' Macro84 Macro ' ' "&chr(10)&" o Application: 30–40%. ' "&chr(10)&" o Analysis/Evaluation: 20–25%. ' "&chr(10)&" Mark Allocation by Module ' "&chr(10)&" Module Weighting (%) ' "&chr(10)&" Principles of Electricity 30 '

' Selection.MoveDown Unit:=wdLine, Count:=43 Selection.Copy End Sub Sub Macro85() Attribute Macro85.VB_Description = " \r\n B=μI2pr,B = \frac{\mu I}{2 \pi r}, \r\n where μ\mu is permeability. \r\n 3. Inductance in DC Circuits: \r\n o Find inductance: \r\n _ \r\n L=N2μAl,L " ' ' Macro85 Macro ' ' "&chr(10)&" B=μI2pr,B = \frac{\mu I}{2 \pi r}, ' "&chr(10)&" where μ\mu is permeability. ' "&chr(10)&" 3. Inductance in DC Circuits: ' "&chr(10)&" o Find inductance: ' "&chr(10)&" ' "&chr(10)&" L=N2μAl,L ' Selection.MoveDown Unit:=wdLine, Count:=65 ActiveWindow.ActivePane.VerticalPercentScrolled = -103 Selection.Copy End Sub Sub Macro86() ' ' Macro86 Macro ' ' "&chr(10)&" To calculate the energy dissipated in resistive circuits over time, use: ' "&chr(10)&" ' "&chr(10)&" E=?0TP(t) dt,P(t)=I(t)2R.E = \int_0^T P(t) , dt, \quad P(t) = I(t)^2 R. ' "&chr(10)&" Example: A resistor ' Selection.Copy End Sub Sub Macro87() ' ' Macro87 Macro ' ' "&chr(10)&" 1. Substitute I(t)I(t): ' "&chr(10)&" ' "&chr(10)&" E=?02(4sin?(pt))2·5 dt=5?0216sin?2(pt) dt.E = \int_0^2 (4 \sin(\pi t))^2 \cdot 5 , dt = 5 \int_0^2 16 \sin^2(\pi t) , dt. ' "&chr(10)&" 2. Simplify using sin?2(x)= ' Selection.Copy End Sub Sub Macro88() Attribute Macro88.VB_Description = " \r\n 3. Solve: \r\n \r\n ?021 dt=2,?02cos?(2pt) dt=0.\int_0^2 1 \, dt = 2, \quad \int_0^2 \cos(2\pi t) \, dt = 0. \r\n Thus: \r\n _ \r\n E=40·2=80 J.E " ' ' Macro88 Macro ' ' "&chr(10)&" 3. Solve: ' "&chr(10)&" ' "&chr(10)&" ?021 dt=2,?02cos?(2pt) dt=0.\int_0^2 1 , dt = 2, \quad \int_0^2 \cos(2\pi t) , dt = 0. ' "&chr(10)&" Thus: ' "&chr(10)&" ' "&chr(10)&" E=40·2=80 J.E ' Selection.Copy End Sub Sub Macro89() ' ' Macro89 Macro ' dVdt=IC,where I=VR. \frac{dV}{dt} = \frac{I}{C}, \quad \text{where } I = \frac{V}{R}. ' "&chr(10)&" Example: For V(t)=50exp?(-t/RC) VV(t) = 50 \exp(-t/RC) , \text{V}, calculate the rate of voltage drop at t=2 st = 2 , \text{s} given R=10 OR = 1 ' Selection.Copy End Sub Sub Macro90() ' ' Macro90 Macro ' 1. Differentiate V(t)V(t): ' "&chr(10)&" ' "&chr(10)&" dVdt=ddt(50exp?(-t/(10·0.01)))=50·-10.1exp?(-t/0.1).\frac{dV}{dt} = \frac{d}{dt} \left(50 \exp(-t/(10 \cdot 0.01)) \right) = 50 \cdot -\frac{1}{0.1} \exp(-t/0.1). ' Selection.Copy End Sub Sub Macro91() ' ' Macro91 Macro ' Magnetic flux through a coil with NN turns is: ' "&chr(10)&" ' "&chr(10)&" F=?B dA,\Phi = \int B , dA, ' "&chr(10)&" where BB is the magnetic field strength. ' "&chr(10)&" Example: A uniform magnetic field B=0.02 ' Selection.MoveDown Unit:=wdLine, Count:=22 Selection.Copy End Sub Sub Macro92() ' ' Macro92 Macro ' ' "&chr(10)&" A=0.1·0.1=0.01 m2.A = 0.1 \cdot 0.1 = 0.01 , \text{m}^2. ' "&chr(10)&" 2. Flux: ' "&chr(10)&" ' "&chr(10)&" F=B·A=0.02·0.01=2×10-4 Wb.\Phi = B \cdot A = 0.02 \cdot 0.01 = 2 \times 10^{-4} , \text{Wb}. ' Selection.MoveDown Unit:=wdLine, Count:=27 Selection.Copy End Sub Sub Macro93() ' ' Macro93 Macro ' ' "&chr(10)&" Z=R2+(XL-XC)2,XL=2pfL,XC=12pfC.Z = \sqrt{R^2 + \left(X_L - X_C \right)^2}, \quad X_L = 2\pi f L, \quad X_C = \frac{1}{2\pi f C}. ' "&chr(10)&" Example: Find dZdf\frac{dZ}{df} for R=50 OR = 50 , \Omega, L=0.1 HL = 0.1
' Selection.MoveDown Unit:=wdLine, Count:=23 ActiveWindow.ActivePane.VerticalPercentScrolled = -124 Selection.Copy End Sub Sub Macro94() ' ' Macro94 Macro ' ' "&chr(10)&" Vout(t)=RC·dVindt=(1×103·10×10-6)·10·2pcos?(2pt).V_{out}(t) = RC \cdot \frac{dV_{in}}{dt} = (1 \times 10^3 \cdot 10 \times 10^{-6}) \cdot 10 \cdot 2\pi \cos(2\pi t). ' "&chr(10)&" ' "&chr(10)&" Vout(t)=0.2pcos?(2pt) V.V_{o ' Selection.MoveDown Unit:=wdLine, Count:=19 Selection.Copy End Sub Sub Macro95() ' ' Macro95 Macro ' Vout(t)=1RC?Vin(t) dt.V_{out}(t) = \frac{1}{RC} \int V_{in}(t) , dt. ' "&chr(10)&" Example: For Vin(t)=5t VV_{in}(t) = 5t , \text{V}, find Vout(t)V_{out}(t) with R=2 kOR = 2 , \text{k}\Omega, C=100 μFC = 100 , \mu\text{F}. ' Selection.Copy End Sub Sub Macro96() Attribute Macro96.VB_Description = "\r\n 1. Integrate VinV_{in}: \r\n \r\n ?Vin(t) dt=?5t dt=5t22.\int V_{in}(t) \, dt = \int 5t \, dt = \frac{5t^2}{2}. \r\n 2. Calculate Vout(t)V_{out}(t): \r\n _ " ' ' Macro96 Macro ' ' "&chr(10)&" 1. Integrate VinV_{in}: ' "&chr(10)&" ' "&chr(10)&" ?Vin(t) dt=?5t dt=5t22.\int V_{in}(t) , dt = \int 5t , dt = \frac{5t^2}{2}. ' "&chr(10)&" 2. Calculate Vout(t)V_{out}(t): ' "&chr(10)&" ' Selection.MoveDown Unit:=wdLine, Count:=22 Selection.Copy End Sub Sub Macro97() ' '

(t). " &chr(10)&" " Selection.MoveDown Unit:=wdLine, Count:=23 Selection.Copy End Sub Sub Macro97() Macro97 Macro ' Rs=Vsupply-VzenerIzener.R_s = \frac{V_{supply} - V_{zener}}{I_{zener}}. ' "&chr(10)&" Power Dissipation in the Zener: ' "&chr(10)&" ' "&chr(10)&" P=Vzener·Izener.P = V_{zener} \cdot I_{zener}. ' "&chr(10)&" Example ' Selection.Copy End Sub Sub Macro98() Attribute Macro98.VB_Description = " \r\n 1. Series Resistance: \r\n \r\n Rs=15-5.60.05=188 O.R_s = \frac{15 - 5.6}{0.05} = 188 \, \Omega. \r\n 2. Power Dissipation: \r\n _ \r\n P=5.6·0." ' ' Macro98 Macro ' ' "&chr(10)&" 1. Series Resistance: ' "&chr(10)&" ' "&chr(10)&" Rs=15-5.60.05=188 O.R_s = \frac{15 - 5.6}{0.05} = 188 , \Omega. ' "&chr(10)&" 2. Power Dissipation: ' "&chr(10)&" ' "&chr(10)&" P=5.6·0. ' Selection.MoveDown Unit:=wdLine, Count:=28 Selection.Copy End Sub Sub Macro99() ' ' Macro99 Macro ' f0=12pLC.f_0 = \frac{1}{2\pi\sqrt{LC}}. ' "&chr(10)&" Example: For L=5 mHL = 5 , \text{mH} and C=200 µFC = 200 , \mu\text{F}, calculate f0f_0: ' "&chr(10)&" ' "&chr(10)&" f0=12p5×10-3·200×10-6.f_0 = \frac{1}{2\pi\sqrt{5 ' Selection.MoveDown Unit:=wdLine, Count:=83 Selection.Copy End Sub Sub Macro100() ' ' Macro100 Macro ' ' "&chr(10)&" Calculate the rate of change of input voltage dVdt\frac{dV}{dt}, capacitance (CC), resistance (RR), and time constant for an RC integrator given: ' "&chr(10)&" · R=2 kOR = 2 , \text{k}\Omega, ' "&chr(10)&" · C=50 µFC = 5 ' Selection.Copy End Sub Sub Macro101() Attribute Macro101.VB_Description = "1. Time Constant: \r\n \r\n t=RC=2×103·50×10-6=0.1 s.\tau = RC = 2 \times 10^3 \cdot 50 \times 10^{-6} = 0.1 \, \text{s}. \r\n 2. Rate of Change: \r\n _ \r\n dV" ' ' Macro101 Macro ' 1. Time Constant: ' "&chr(10)&" ' "&chr(10)&" t=RC=2×103·50×10-6=0.1 s.\tau = RC = 2 \times 10^3 \cdot 50 \times 10^{-6} = 0.1 , \text{s}. ' "&chr(10)&" 2. Rate of Change: ' "&chr(10)&" ' "&chr(10)&" dV ' Selection.Copy End Sub Sub Macro102() ' ' Macro102 Macro ' ' "&chr(10)&" Calculation Example: If R=100 OR = 100 , \Omega, L=0.1 HL = 0.1 , \text{H}, and Vin(t)=20sin?(10t)V_{in}(t) = 20 \sin(10t), calculate: ' "&chr(10)&" 1. Time Constant: ' "&chr(10)&" ' "&chr(10)&" t=LR=0.1100=0.0 ' Selection.MoveDown Unit:=wdLine, Count:=29 Selection.Copy End Sub Sub Macro103() ' ' Macro103 Macro ' Analysis Using Complex Numbers: ' "&chr(10)&" In an RLC circuit: ' "&chr(10)&" 1. Impedance: ' "&chr(10)&" ' "&chr(10)&" Z=R+j(XL-XC),XL=?L,XC=1?C.Z = R + j(X_L - X_C), \quad X_L = \omega L, \quad X_C = \frac{1}{\o ' Selection.Copy End Sub Sub Macro104() ' ' Macro104 Macro ' Z=R+j(XL-XC),XL=?L,XC=1?C.Z = R + j(X_L - X_C), \quad X_L = \omega L, \quad X_C = \frac{1}{\omega C}. ' "&chr(10)&" 2. Power Factor: ' "&chr(10)&" ' "&chr(10)&" cos??=R|Z|.\cos\phi = \frac{R}{|Z|}. ' "&chr(10)&" E ' Selection.Copy End Sub Sub Macro105() ' ' Macro105 Macro ' ' "&chr(10)&" Example: ' "&chr(10)&" For R=10 OR = 10 , \Omega, L=0.05 HL = 0.05 , \text{H}, C=20 µFC = 20 , \mu\text{F}, and f=1 kHzf = 1 , \text{kHz}: ' "&chr(10)&" 1. Calculate XLX_L and XCX_C: ' "&chr(10)&" ' Selection.Copy End Sub Sub Macro106() ' ' Macro106 Macro ' ' "&chr(10)&" Z=R2+(XL-XC)2=102+(314-8)2˜306 O.Z = \sqrt{R^2 + (X_L - X_C)^2} = \sqrt{10^2 + (314 - 8)^2} \approx 306 , \Omega. ' "&chr(10)&" Resonance in RLC Circuits ' "&chr(10)&" Key Formulas: ' "&chr(10)&" 1. Resonance Fr ' ActiveWindow.ActivePane.VerticalPercentScrolled = -147 Selection.MoveDown Unit:=wdLine, Count:=1 Selection.Copy End Sub Sub Macro107() ' ' Macro107 Macro ' Industrial Electronics N4 syllabus focuses on building a strong foundation in electrical and electronic principles through key modules like Network Theorems, Alternating Current Theory, Electronic Power Control, and others. Here's a breakdown of the core ' Selection.MoveDown Unit:=wdLine, Count:=31 Selection.Copy End Sub Sub Macro108() ' ' Macro108 Macro ' ' "&chr(10)&" ?Iin=?Iout.\sum I_{\text{in}} = \sum I_{\text{out}}. ' "&chr(10)&" 2. Second Law (Voltage Law): ' "&chr(10)&" o The sum of voltage drops in a closed loop equals the sum of EMFs: ' "&chr(10)&" ' Selection.Copy End Sub Sub Macro109() ' ' Macro109 Macro ' ' "&chr(10)&" ?V=0.\sum V = 0. ' "&chr(10)&" Example: For a loop with V1=10 VV_1 = 10 , \text{V}, R1=2 OR_1 = 2 , \Omega, and R2=3 OR_2 = 3 , \Omega: ' "&chr(10)&" 1. Apply Kirchhoff's Voltage Law: ' "&chr(10)&" ' Selection.MoveDown Unit:=wdLine, Count:=20 Selection.Copy End Sub Sub Macro110() ' ' Macro110 Macro ' o Any linear circuit can be simplified to a single voltage source (VthV_{th}) and a series resistance (RthR_{th}). ' "&chr(10)&" 2. Steps: ' "&chr(10)&" o Remove the load. ' "&chr(10)&" o Calculate VthV_{th} across the open t ' Selection.Copy End Sub Sub Macro111() ' ' Macro111 Macro ' o Determine RthR_{th} by deactivating all sources (replace voltage sources with short circuits and current sources with open circuits). ' "&chr(10)&" Example: For a circuit with Vs=12 VV_s = 12 , \text{V}, R1=4 OR_1 = 4 , \Omega, and R2=6 OR_2 ' Selection.MoveDown Unit:=wdLine, Count:=33 Selection.Copy End Sub Sub Macro112() ' ' Macro112 Macro ' Example: For Rth=10 OR_{th} = 10 , \Omega, calculate maximum power if Vth=20 VV_{th} = 20 , \text{V}: ' "&chr(10)&" ' "&chr(10)&" Pmax=Vth24Rth=2024·10=10 W.P_{\text{max}} = \frac{V_{th}^2}{4R_{th}} = \frac{20^2}{4 \cdot 10} = 10 , ' Selection.Copy End Sub Sub Macro113() ' ' Macro113 Macro ' ' "&chr(10)&" Z=R+j(XL-XC),XL=?L,XC=1?C.Z = R + j(X_L - X_C), \quad X_L = \omega L, \quad X_C = \frac{1}{\omega C}. ' "&chr(10)&" · Parallel Circuit: ' "&chr(10)&" ' "&chr(10)&" 1Z=1R2+(1XC-1XL)2.\frac{1}{Z} = \sqrt{\frac{1}{R '

Selection.Copy End Sub Sub Macro114() ' ' Macro114 Macro ' Example: For R=10 OR = 10 , \Omega, L=0.1 HL = 0.1 , \text{H}, C=10 µFC = 10 , \mu\text{F}, and f=50 Hzf = 50 , \text{Hz}: ' "&chr(10)&" 1. Inductive Reactance: ' "&chr(10)&" ' "&chr(10)&" XL=2pfL=2p·50·0.1=31.4 O.X_L = ' Selection.MoveDown Unit:=wdLine, Count:=38 Selection.Copy End Sub Sub Macro115() ' ' Macro115 Macro ' 2. Bandwidth: ' "&chr(10)&" ' "&chr(10)&" BW=frQ,Q=?rLR.BW = \frac{f_r}{Q}, \quad Q = \frac{\omega_r L}{R}. ' "&chr(10)&" Example: For L=0.5 HL = 0.5 , \text{H}, C=20 µFC = 20 , \mu\text{F}, and R=10 OR = 10 , \Omega: ' Selection.Copy End Sub Sub Macro116() ' ' Macro116 Macro ' ' "&chr(10)&" ' "&chr(10)&" fr=12p0.5·20×10-6˜50.33 Hz.f_r = \frac{1}{2\pi\sqrt{0.5 \cdot 20 \times 10^{-6}}} \approx 50.33 , \text{Hz}. ' "&chr(10)&" 2. Quality Factor: ' "&chr(10)&" ' "&chr(10)&" Q=?rLR=2p·50 ' Selection.MoveDown Unit:=wdLine, Count:=59 Selection.Copy End Sub Sub Macro117() Attribute Macro117.VB_Description = "\r\n 3.1 Semiconductor Diode \r\n 1. Diode Equation: \r\n o Forward current: \r\n \r\n I=Is·(eqVkT-1),I = I_s \cdot \left(e^{\frac{qV}{kT}} - 1\right), _ \r\n whe" ' ' Macro117 Macro ' ' "&chr(10)&" 3.1 Semiconductor Diode ' "&chr(10)&" 1. Diode Equation: ' "&chr(10)&" o Forward current: ' "&chr(10)&" ' "&chr(10)&" I=Is·(eqVkT-1),I = I_s \cdot \left(e^{\frac{qV}{kT}} - 1\right), ' "&chr(10)&" whe ' Selection.Copy End Sub Sub Macro118() ' ' Macro118 Macro ' ' "&chr(10)&" Example Calculation: Given Is=10-12 AI_s = 10^{-12} , \text{A}, V=0.7 VV = 0.7 , \text{V}, T=300 KT = 300 , \text{K}: ' "&chr(10)&" 1. Compute: ' "&chr(10)&" ' "&chr(10)&" I=10-12·(e1.6×10-19·0.71.38×10-23·30 ' Selection.Copy End Sub Sub Macro119() ' ' Macro119 Macro ' ' "&chr(10)&" I=10-12·(e1.6×10-19·0.71.38×10-23·300-1).I = 10^{-12} \cdot \left(e^{\frac{1.6 \times 10^{-19} \cdot 0.7}{1.38 \times 10^{-23} \cdot 300}} - 1\right). ' "&chr(10)&" 2. Result: ' "&chr(10)&" ' "&chr(10)&" I˜0.001 ' Selection.MoveDown Unit:=wdLine, Count:=20 Selection.Copy End Sub Sub Macro120() ' ' Macro120 Macro ' 3.2 Electronic Power Control Devices ' "&chr(10)&" · SCR (Silicon Controlled Rectifier): ' "&chr(10)&" o Conducts when triggered by a gate signal, and blocks when reversed. ' "&chr(10)&" · DIAC: ' "&chr(10)&" o Bidi ' Selection.MoveDown Unit:=wdLine, Count:=35 End Sub Sub Macro121() Attribute Macro121.VB_Description = "Transformer Ratios: \r\n · Voltage Ratio: \r\n \r\n Vs=Vp·NsNp.V_s = V_p \cdot \frac{N_s}{N_p}. \r\n · Current Ratio: _ \r\n \r\n Is=Ip·NpNs." ' ' Macro121 Macro ' Transformer Ratios: ' "&chr(10)&" · Voltage Ratio: ' "&chr(10)&" ' "&chr(10)&" Vs=Vp·NsNp.V_s = V_p \cdot \frac{N_s}{N_p}. ' "&chr(10)&" · Current Ratio: ' "&chr(10)&" ' "&chr(10)&" Is=Ip·NpNs. ' Selection.Copy End Sub Sub Macro122() ' ' Macro122 Macro ' ' "&chr(10)&" Is=Ip·NpNs.I_s = I_p \cdot \frac{N_p}{N_s}. ' "&chr(10)&" Example Calculation: Given Np=300N_p = 300, Ns=100N_s = 100, and Vp=240 V RMSV_p = 240 , \text{V RMS}: ' "&chr(10)&" 1. Secondary Voltage: ' "&chr(10)&" ' Selection.Copy End Sub Sub Macro123() ' ' Macro123 Macro ' RF=(VACVDC)2-1.RF = \sqrt{\left(\frac{V_{AC}}{V_{DC}}\right)^2 - 1}. ' "&chr(10)&" 2. Full-Wave Rectifier: ' "&chr(10)&" o Utilizes both cycles, reducing ripple. ' "&chr(10)&" Efficiency: ' "&chr(10)&" ' Selection.Copy End Sub Sub Macro124() Attribute Macro124.VB_Description = " \r\n \r\n ?=PDCPAC.\eta = \frac{P_{DC}}{P_{AC}}. \r\n Module 5: Amplifiers \r\n Transistor Amplifier Configurations \r\n 1. Common Emitter (CE): _ \r\n " ' ' Macro124 Macro ' ' "&chr(10)&" ' "&chr(10)&" ?=PDCPAC.\eta = \frac{P_{DC}}{P_{AC}}. ' "&chr(10)&" Module 5: Amplifiers ' "&chr(10)&" Transistor Amplifier Configurations ' "&chr(10)&" 1. Common Emitter (CE): ' "&chr(10)&" ' Selection.Copy End Sub Sub Macro125() ' ' Macro125 Macro ' ' "&chr(10)&" 1. AM Signal Equation: ' "&chr(10)&" ' "&chr(10)&" m(t)=Ac(1+macos??mt)cos??ct,m(t) = A_c(1 + m_a \cos \omega_m t) \cos \omega_c t, ' "&chr(10)&" where mam_a: modulation index, AcA_c: carrier amplitude, ?c\ome ' Selection.Copy End Sub Sub Macro126() ' ' Macro126 Macro ' ' "&chr(10)&" 2. FM Signal Equation: ' "&chr(10)&" ' "&chr(10)&" f(t)=cos?(?ct+ßsin??mt),f(t) = \cos (\omega_c t + \beta \sin \omega_m t), ' "&chr(10)&" where ß\beta: modulation index. ' Selection.Copy End Sub Sub Macro127() ' ' Macro127 Macro ' · Demodulation: ' "&chr(10)&" o Reverse process to recover original information from modulated signals. ' "&chr(10)&" o Methods include envelope detection (AM) and phase-lock loops (FM). ' "&chr(10)&" 2. Antenna Systems ' Selection.MoveDown Unit:=wdLine, Count:=89 Selection.Copy End Sub Sub Macro128() ' ' Macro128 Macro ' Advanced Calculations in Signal Modulation ' "&chr(10)&" 1. Amplitude Modulation (AM): ' "&chr(10)&" The transmitted AM signal is given by: ' "&chr(10)&" ' "&chr(10)&" m(t)=Ac[1+macos?(?mt)]cos?(?ct),m(t) = A_c [1 ' Selection.MoveDown Unit:=wdLine, Count:=27 Selection.Copy End Sub Sub Macro129() ' ' Macro129 Macro ' ' "&chr(10)&" · mam_a: Modulation index, calculated as ma=AmAcm_a = \frac{A_m}{A_c}, ' "&chr(10)&" · ?c=2pfc\omega_c = 2\pi f_c: Carrier angular frequency, ' "&chr(10)&" · ?m=2pfm\omega_m = 2\pi f_m: Message angular frequency. ' Selection.Copy End Sub Sub Macro130() ' ' Macro130 Macro ' ' "&chr(10)&" Example Calculation: For Ac=5 VA_c = 5 , \text{V}, Am=2 VA_m = 2 , \text{V}, fc=100 kHzf_c = 100 , \text{kHz}, fm=1 kHzf_m = 1 , \text{kHz}: ' "&chr(10)&" 1. Modulation Index: ' "&chr(10)&" ' "&chr(10)&" ma=AmAc=25 ' Selection.Copy End Sub Sub Macro131() ' '

Macro131 Macro ' 2. AM Signal Equation: ' "&chr(10)&" ' "&chr(10)&" m(t)=5[1+0.4cos?(2p·1000t)]cos?(2p·100000t).m(t) = 5 [1 + 0.4 \cos(2\pi \cdot 1000 t)] \cos(2\pi \cdot 100000 t). ' "&chr(10)&" 2. Frequency Modulation (FM): ' Selection.Copy End Sub Sub Macro132() ' ' Macro132 Macro ' ' "&chr(10)&" Example Calculation: For ?f=5 kHz\Delta f = 5 , \text{kHz}, fm=1 kHzf_m = 1 , \text{kHz}, and Ac=10 VA_c = 10 , \text{V}: ' "&chr(10)&" 1. Modulation Index: ' "&chr(10)&" ' "&chr(10)&" ß=?ffm=50001000=5.\b ' ActiveWindow.ActivePane.VerticalPercentScrolled = -173 Selection.Copy End Sub Sub Macro133() ' ' Macro133 Macro ' o Testing electrical wiring. ' "&chr(10)&" o Fault-finding in electrical machines. ' "&chr(10)&" o Renewable energy system maintenance. ' "&chr(10)&" 5. Practical Career Applications ' "&chr(10)&" · Learners apply s ' ActiveWindow.ActivePane.VerticalPercentScrolled = -173 Selection.Copy End Sub Sub Macro134() ' ' Macro134 Macro ' ' "&chr(10)&" Key Role: Integrals help analyze energy storage, system behavior over time, and power distribution in circuits. ' "&chr(10)&" · Energy Stored in Capacitors: $$ E = \frac{1}{2} C V^2 $$ Example: For a capacitor with C=10µFC = 10 \m ' Selection.Copy End Sub Sub Macro135() ' ' Macro135 Macro ' ' "&chr(10)&" · Total Energy in a Time Period (AC Systems): Calculate energy consumption using: $$ E = \int P(t) , dt $$ $$ $IfP(t) = 5sin?(2pt)P(t) = 5\sin(2\pi t), solve:$ E = \int_0^{1} 5 \sin(2\pi t) , dt. $$ ' "&chr(10)&" 2. Derivative Calc ' Selection.Copy End Sub Sub Macro136() ' ' Macro136 Macro ' ' "&chr(10)&" · Induced Voltage in Inductors: Voltage across an inductor is: $$ V(t) = L \frac{di(t)}{dt}. $$ Example: With L=5HL = 5H and i(t)=t2i(t) = t^2: $$ V(t) = 5 \times \frac{d(t^2)}{dt} = 10t. $$ At (t = 2s, V(2) = 10 \times 2 = 20V. $$ ' Selection.MoveDown Unit:=wdLine, Count:=102 Selection.Copy End Sub Sub Macro137() ' ' Macro137 Macro ' ' "&chr(10)&" · Resistance Testing: ' "&chr(10)&" o Verifying earth resistance must ensure values below 2 O, calculated using Ohm's law: $$ R = \frac{V}{I} $$ ' "&chr(10)&" · Insulation Resistance: ' "&chr(10)&" o This should exceed ' End Sub Sub Macro138() ' ' Macro138 Macro ' ' "&chr(10)&" o Verifying earth resistance must ensure values below 2 O, calculated using Ohm's law: $$ R = \frac{V}{I} $$ ' "&chr(10)&" · Insulation Resistance: ' "&chr(10)&" o This should exceed 1 MO, confirming isolation standards ' Selection.MoveDown Unit:=wdLine, Count:=57 End Sub

UserForm1 - 1 Private Sub Label1_Click() End Sub Private Sub Label15_Click() End Sub Private Sub Label2_Click() End Sub Private Sub Label9_Click() End Sub Private Sub ListBox1_Click() End Sub Private Sub MultiPage1_Change() End Sub Private Sub MultiPage2_Change() End Sub Private Sub SpinButton1_Change() End Sub Private Sub SpinButton2_Change() End Sub Private Sub TabStrip1_Change() End Sub Private Sub TextBox1_Change() End Sub Private Sub TextBox10_Change() End Sub Private Sub TextBox11_Change() End Sub Private Sub TextBox13_Change() End Sub Private Sub TextBox14_Change() End Sub Private Sub TextBox15_Change() End Sub Private Sub TextBox16_Change() End Sub Private Sub TextBox17_Change() End Sub Private Sub TextBox18_Change()UserForm1 - 2 End Sub Private Sub TextBox19_Change() End Sub Private Sub TextBox2_Change() End Sub Private Sub TextBox20_Change() End Sub Private Sub TextBox21_Change() End Sub Private Sub TextBox4_Change() End Sub Private Sub TextBox6_Change() End Sub Private Sub TextBox7_Change() End Sub Private Sub TextBox8_Change() End Sub Private Sub TextBox9_Change() End Sub Private Sub ToggleButton1_Click() End Sub Private Sub UserForm_AddControl(ByVal Control As MSForms.Control) End Sub Private Sub UserForm_BeforeDragOver(ByVal Cancel As MSForms.ReturnBoolean, ByVal Control As MSForms.Co ntrol, ByVal Data As MSForms.DataObject, ByVal X As Single, ByVal Y As Single, ByVal State As MSForms. fmDragState, ByVal Effect As MSForms.ReturnEffect, ByVal Shift As Integer) End Sub Private Sub UserForm_BeforeDropOrPaste(ByVal Cancel As MSForms.ReturnBoolean, ByVal Control As MSForms .Control, ByVal Action As MSForms.fmAction, ByVal Data As MSForms.DataObject, ByVal X As Single, ByVal Y As Single, ByVal Effect As MSForms.ReturnEffect, ByVal Shift As Integer) End Sub Private Sub UserForm_Click() End Sub Private Sub UserForm_DblClick(ByVal Cancel As MSForms.ReturnBoolean) End Sub Private Sub UserForm_Deactivate() End Sub Private Sub UserForm_Error(ByVal Number As Integer, ByVal Description As MSForms.ReturnString, ByVal S Code As Long, ByVal Source As String, ByVal HelpFile As String, ByVal HelpContext As Long, ByVal CanceUserForm1 - 3 lDisplay As MSForms.ReturnBoolean) End Sub Private Sub UserForm_Initialize() End Sub Private Sub UserForm_KeyPress(ByVal KeyAscii As MSForms.ReturnInteger) End Sub Private Sub UserForm_Layout() End Sub Private Sub UserForm_MouseDown(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByV al Y As Single) End Sub Private Sub UserForm_MouseMove(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByV al Y As Single) End Sub Private Sub UserForm_MouseUp(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByVal Y As Single) End Sub Private Sub UserForm_RemoveControl(ByVal Control As MSForms.Control) End Sub Private Sub UserForm_Resize() End Sub Private Sub UserForm_Scroll(ByVal ActionX As MSForms.fmScrollAction, ByVal

ActionY As MSForms.fmScroll Action, ByVal RequestDx As Single, ByVal RequestDy As Single, ByVal ActualDx As MSForms.ReturnSingle, ByVal ActualDy As MSForms.ReturnSingle) End Sub Private Sub UserForm_Terminate() End Subregister academic engineering national trade certificate diploma engineering / system matter expert intelligence artificial .. data base system education trade and vocational system theoretical base pratical base learning system information learner academic education subject module mathematics subject module engineering science subject module engineering drawing subject module engineering elctrical subject module electrical trade theory subject module industrial electronics "txt _labell2 "=" true and lette "txt _labell3 "=" true and letter entry " "txt _labell4 "=" true and letter entry " "txt _labell5 "=" true and letter entry " "txt _labell6 "=" true and letter entry " "txt _labell7 "=" true and letter entry " subject module fault find "txt _labell8 "=" true and letter entry " subject module installer rules electrical subject module logic control subject module logic system subject module power machine subject module information management system / information anangement document subject module orientation industrial/ businnnes english subject module supevisor industrial/ manangement supervisor "txt _labell9 "=" true and letter entry "txt _labell10"=" true and letter entry "txt _labell11 "=" true and letter entr "txt _labell12 "=" true and letter entr "txt _labell14"=" true and letter entry "txt _labell15 "=" true and letter entry "txt _labell2 "=" true and letter entry " subject module electrotech subject electrotechnology subject module mechanotechnology. meactech subject engineering civil building science , drawing building , carpentery business / it module outcome totoal career electrical / power system, generation transmission Frame1 ok cancel next Tab1 Tab2 Page1 Page2 "txt _labell2 "=" true and letter entry ToggleButt on1

UserForm4 - 1 Private Sub CommandButton1_Click() End Sub Private Sub CommandButton2_Click() End Sub Private Sub CommandButton3_Click() End Sub Private Sub Frame1_Click() End Sub Private Sub Frame2_Click() End Sub Private Sub Label1_Click() End Sub Private Sub Label10_Click() End Sub Private Sub Label11_Click() End Sub Private Sub Label3_Click() End Sub Private Sub Label5_Click() End Sub Private Sub Label6_Click() End Sub Private Sub Label7_Click() End Sub Private Sub Label8_Click() End Sub Private Sub Label9_Click() End Sub Private Sub MultiPage2_Change() End Sub Private Sub SpinButton2_Change() End Sub Private Sub TextBox1_Change() End Sub Private Sub TextBox2_Change() End Sub Private Sub TextBox3_Change()UserForm4 - 2 End Sub Private Sub TextBox4_Change() End Sub Private Sub TextBox5_Change() End Sub Private Sub TextBox6_Change() End Sub Private Sub TextBox7_Change() End Sub Private Sub TextBox8_Change() End Sub Private Sub TextBox9_AfterUpdate() End Sub Private Sub TextBox9_BeforeDragOver(ByVal Cancel As MSForms.ReturnBoolean, ByVal Data As MSForms.DataO bject, ByVal X As Single, ByVal Y As Single, ByVal DragState As MSForms.fmDragState, ByVal Effect As M SForms.ReturnEffect, ByVal Shift As Integer) End Sub Private Sub TextBox9_BeforeDropOrPaste(ByVal Cancel As MSForms.ReturnBoolean, ByVal Action As MSForms. fmAction, ByVal Data As MSForms.DataObject, ByVal X As Single, ByVal Y As Single, ByVal Effect As MSFo rms.ReturnEffect, ByVal Shift As Integer) End Sub Private Sub TextBox9_BeforeUpdate(ByVal Cancel As MSForms.ReturnBoolean) End Sub Private Sub TextBox9_Change() End Sub Private Sub TextBox9_DblClick(ByVal Cancel As MSForms.ReturnBoolean) End Sub Private Sub TextBox9_DropButtonClick() End Sub Private Sub TextBox9_Enter() End Sub Private Sub TextBox9_Exit(ByVal Cancel As MSForms.ReturnBoolean) End Sub Private Sub TextBox9_KeyDown(ByVal KeyCode As MSForms.ReturnInteger, ByVal Shift As Integer) End Sub Private Sub TextBox9_KeyPress(ByVal KeyAscii As MSForms.ReturnInteger) End Sub Private Sub TextBox9_MouseDown(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByV al Y As Single)UserForm4 - 3 End Sub Private Sub TextBox9_MouseMove(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByV al Y As Single) End Sub Private Sub TextBox9_MouseUp(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByVal Y As Single) End Sub Private Sub UserForm_Click() End Subregister workplace log activity framework experimental theoretical base pratical industrial workplace trade and vocational career outcome workshop lab ,intelligence artificial expert matter training trainer system occupation subject module lab workshop subject module office workplace subject outcome total subject training career mentoring "txt _labell2"="true and value" "txt _labell3"="true and value" "txt _labell4"="true and value" "txt _labell4"="true and value" Page1 Page2 "txt _labell2"="true and value" textbook catalogue , magazine trade text bulletin trade , salary ,low rules manufacture framewor qualification custumer product trade and vocationel configuration trading product "txt _labell5"="true and value" "txt _labell6"="true and value" product project customer employment database "txt _labell7"="true and value" "txt _labell8"="true and value" Frame1 ok cancell next report work activity total subject training outcome and workshop lab office manufacture

activity total subject training outcome and workshop lab office manufacture

UserForm15 - 1 Private Sub CommandButton1_Click() End Sub Private Sub CommandButton2_Click() End Sub Private Sub CommandButton3_Click() End Sub Private Sub CommandButton4_Click() End Sub Private Sub CommandButton5_Click() End Sub Private Sub Frame1_Click() End Sub Private Sub Frame2_Click() End Sub Private Sub Label2_Click() End Sub Private Sub Label3_Click() End Sub Private Sub Label6_Click() End Sub Private Sub Label8_Click() End Sub Private Sub Label9_Click() End Sub Private Sub TextBox1_Change() End Sub Private Sub TextBox2_Change() End Sub Private Sub TextBox3_Change() End Sub Private Sub TextBox5_Change() End Sub Private Sub TextBox6_Change() End Sub Private Sub TextBox7_Change() End SubUserForm15 - 2 Private Sub TextBox8_BeforeDragOver(ByVal Cancel As MSForms.ReturnBoolean, ByVal Data As MSForms.DataO bject, ByVal X As Single, ByVal Y As Single, ByVal DragState As MSForms.fmDragState, ByVal Effect As M SForms.ReturnEffect, ByVal Shift As Integer) End Sub Private Sub TextBox8_BeforeDropOrPaste(ByVal Cancel As MSForms.ReturnBoolean, ByVal Action As MSForms. fmAction, ByVal Data As MSForms.DataObject, ByVal X As Single, ByVal Y As Single, ByVal Effect As MSFo rms.ReturnEffect, ByVal Shift As Integer) End Sub Private Sub TextBox8_Change() End Sub Private Sub TextBox8_DropButtonClick() End Sub Private Sub TextBox8_Enter() End Sub Private Sub TextBox8_Exit(ByVal Cancel As MSForms.ReturnBoolean) End Sub Private Sub TextBox8_KeyDown(ByVal KeyCode As MSForms.ReturnInteger, ByVal Shift As Integer) End Sub Private Sub TextBox8_KeyPress(ByVal KeyAscii As MSForms.ReturnInteger) End Sub Private Sub TextBox8_KeyUp(ByVal KeyCode As MSForms.ReturnInteger, ByVal Shift As Integer) End Sub Private Sub TextBox8_MouseMove(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByV al Y As Single) End Sub Private Sub UserForm_Click() Public Class transactionsGBox Const SERVICE_CHARGE_DECIMAL As Decimal = 6.5 Const PIN As Integer = 9343 UserForm15 - 3 Dim Balance As Decimal = 150 Private Sub Label2_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles L abel2.Click End Sub Private Sub RadioButton5_CheckedChanged(ByVal sender As System.Object, ByVal e As System.Event Args) Handles topUpButton.CheckedChanged End Sub Private Sub transactionsGBox_Load(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles MyBase.Load End Sub UserForm15 - 4 Private Function withdraw(ByVal amount As Decimal) Balance -= amount Return Balance End Function Private Function deposit(ByRef amount As Decimal) Balance += amount Return Balance UserForm15 - 5 End Function Private Sub Button1_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles clearButton1.Click End Sub Private Sub Button1_Click_1(ByVal sender As System.Object, ByVal e As System.EventArgs) Handle s confirmButton.Click If pinBox.Text = "9343" Then transactionGroupBox.Enabled = True previewButton.Enabled = True proceedButton.Enabled = True pinBox.Enabled = False UserForm15 - 6 Else MessageBox.Show("Incorrect pin, try again", "Pin Error", MessageBoxButtons.OK, Message BoxIcon.Exclamation) End If End Sub Private Sub Label4_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles L abel4.Click End Sub Private Sub Button2_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles clearButton2.Click End Sub UserForm15 - 7 Private Sub exitButton_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handl es exitButton.Click Me.Close() End Sub Private Sub previewButton_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Ha ndles previewButton.Click If depositButton.Checked = True Then previewBalance.Text = deposit(transactionValueBox.Text) Else previewBalance.Text = withdraw(transactionValueBox.Text) UserForm15 - 8 End If End Sub Private Sub proceedButton_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Ha ndles proceedButton.Click If depositButton.Checked = True Then finalBalance.Text = deposit(transactionValueBox.Text) Else finalBalance.Text = withdraw(transactionValueBox.Text) End If UserForm15 - 9 End Sub End Class End Subatm transaction preview balance preview balance Label9 user name card id card pin code amount deposite amount balance charge Frame1 ok cancel CommandButton3

UserForm6 - 1 Private Sub Frame1_Click() End Sub Private Sub Label1_Click() End Sub Private Sub Label10_Click() End Sub Private Sub Label11_Click() End Sub Private Sub Label12_Click() End Sub Private Sub Label13_Click() End Sub Private Sub Label14_Click() End Sub Private Sub Label15_Click() End Sub Private Sub Label16_Click() End Sub Private Sub Label17_Click() End Sub Private Sub Label18_Click() End Sub Private Sub Label19_Click() End Sub Private Sub Label2_Click() End Sub Private Sub Label3_Click() End Sub Private Sub Label4_Click() End Sub Private Sub Label5_Click() End Sub Private Sub Label6_Click() End Sub Private Sub Label7_Click() End Sub Private Sub Label8_Click()UserForm6 - 2 End Sub Private Sub Label9_Click() End Sub Private Sub ListBox1_Click() End Sub Private Sub OptionButton1_Click() End Sub Private Sub

Private Sub ListBox1_Click() End Sub Private Sub OptionButton1_Click() End Sub Private Sub OptionButton2_Click() End Sub Private Sub TextBox1_Change() End Sub Private Sub TextBox3_Change() End Sub Private Sub TextBox5_Change() End Sub Private Sub TextBox7_Change() End Sub Private Sub UserForm_Activate() End Sub Private Sub UserForm_AddControl(ByVal Control As MSForms.Control) End Sub Private Sub UserForm_BeforeDragOver(ByVal Cancel As MSForms.ReturnBoolean, ByVal Control As MSForms.Co ntrol, ByVal Data As MSForms.DataObject, ByVal X As Single, ByVal Y As Single, ByVal State As MSForms. fmDragState, ByVal Effect As MSForms.ReturnEffect, ByVal Shift As Integer) End Sub Private Sub UserForm_Click() End Sub Private Sub UserForm_Deactivate() End Sub Private Sub UserForm_Initialize() End Sub Private Sub UserForm_Layout() End Sub Private Sub UserForm_MouseMove(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByV al Y As Single) End Sub Private Sub UserForm_MouseUp(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByVal Y As Single)UserForm6 - 3 End Sub Private Sub UserForm_RemoveControl(ByVal Control As MSForms.Control) End Sub Private Sub UserForm_Resize() End Sub Private Sub UserForm_Scroll(ByVal ActionX As MSForms.fmScrollAction, ByVal ActionY As MSForms.fmScroll Action, ByVal RequestDx As Single, ByVal RequestDy As Single, ByVal ActualDx As MSForms.ReturnSingle, ByVal ActualDy As MSForms.ReturnSingle) End Sub Private Sub UserForm_Terminate() End Sub Private Sub UserForm_Zoom(Percent As Integer) Application.ScreenUpdating = False Dim sDate As String On Error Resume Next sDate = MyCalendar.DatePicker(Me.txtDOB) Me.txtDOB.Value = Format(sDate, "dd-mmm-yyyy") On Error GoTo 0 Application.ScreenUpdating = True End Sub Private Sub imgCalendar_Click() Application.ScreenUpdating = False Dim sDate As String On Error Resume Next sDate = MyCalendar.DatePicker(Me.txtDOB) Me.txtDOB.Value = Format(sDate, "dd-mmm-yyyy") Sub Reset_Form() Dim iRow As Long With frmDataEntry .txtStudentName.Text = "" .txtStudentName.BackColor = vbWhite .txtFatherName.Text = "" .txtFatherName.BackColor = vbWhite .txtDOB.Text = "" .txtDOB.BackColor = vbWhite .optFemale.Value = False .optMale.Value = False .txtMobile.Value = "" .txtMobile.BackColor = vbWhite .txtEmail.Value = "" .txtEmail.BackColor = vbWhiteUserForm6 - 4 .txtAddress.Value = "" .txtAddress.BackColor = vbWhite .txtRowNumber.Value = "" .txtImagePath.Value = "" .imgStudent.Picture = LoadPicture(vbNullString) .cmdSubmit.Caption = "Submit" '.cmbCourse.Clear .cmbCourse.BackColor = vbWhite 'Dynamic range based on Support Sheet shSupport.Range("A2", shSupport.Range("A" & Rows.Count).End(xlUp)).Name = "Dynamic" .cmbCourse.RowSource = "Dynamic" .cmbCourse.Value = "" .cmbCourse.Value = "" 'Assigning RowSource to lstDatabase .lstDatabase.ColumnCount = 12 .lstDatabase.ColumnHeads = True .lstDatabase.ColumnWidths = "30,70,70,40,45,70,60,60,70,0,0,0" iRow = shDatabase.Range("A" & Rows.Count).End(xlUp).row + 1 ' Identify last blank row If iRow > 1 Then .lstDatabase.RowSource = "Database!A2:L" & iRow Else .lstDatabase.RowSource = "Database!A2:L2" End If End With End Sub On Error GoTo 0 Application.ScreenUpdating = True Set oRegEx = CreateObject("VBScript.RegExp") With oRegEx .Pattern = "^[\w-.]{1,}@([\da-zA-Z-]{1,}.){1,}[\da-zA-Z-]{2,3}$" ValidEmail = .Test(Email) End With Set oRegEx = Nothing GetImagePath = "" With Application.FileDialog(msoFileDialogFilePicker) ' File Picker Dialog box .AllowMultiSelect = False .Filters.Clear ' Clear the exisiting filters .Filters.Add "Images", "*.gif; *.jpg; *.jpeg" 'Add a filter that includes GIF and JPEG images ' show the file picker dialog box If .Show <> 0 Then GetImagePath = .SelectedItems(1) ' Getting the path of selected file name End If End With End FunctionUserForm6 - 5 Sub CreateFolder() Dim strFolder As String ' To hold the folter path where we need to replicate the image strFolder = ThisWorkbook.Path & Application.PathSeparator & "Images" 'Check Directory exist or not. If not exist then it will return blank If Dir(strFolder, vbDirectory) = "" Then MkDir strFolder ' Make a folder with the name of 'Images' End If End Sub Sub LoadImange() Dim imgSourcePath As String ' To store the path of image selected by user Dim imgDestination As String ' To store the path of image selected by user imgSourcePath = Trim(GetImagePath()) ' Call the Function If imgSourcePath = "" Then Exit Sub Call CreateFolder 'Create Image folder if not exist imgDestination = ThisWorkbook.Path & Application.PathSeparator & _ frmDataEntry.txtStudentName & "." & Split(imgSourcePath, ".")(UBound(Split(imgSourcePath, "."))) FileCopy imgSourcePath, imgDestination ' Code to copy image frmDataEntry.imgStudent.PictureSizeMode = fmPictureSizeModeStretch 'Stretch mode frmDataEntry.imgStudent.Picture = LoadPicture(imgDestination) ' Loading picture to imgStudent frmDataEntry.txtImagePath.Value = imgDestination ' Assigning the path to text boxFunction ValidEntry() As Boolean ValidEntry = True With frmDataEntry 'Default Color .txtStudentName.BackColor = vbWhite .txtFatherName.BackColor = vbWhite .txtDOB.BackColor = vbWhite .txtMobile.BackColor = vbWhite .txtEmail.BackColor = vbWhite .txtAddress.BackColor = vbWhite .cmbCourse.BackColor = vbWhite 'Validating Student Name If Trim(.txtStudentName.Value) = "" Then MsgBox "Please enter Student's name.", vbOKOnly +

vbInformation, "Student Name" .txtStudentName.BackColor = vbRed .txtStudentName.SetFocus ValidEntry = False Exit Function End If 'Validating Father's name If Trim(.txtFatherName.Value) = "" Then MsgBox "Please enter Father's name.", vbOKOnly + vbInformation, "Father Name" .txtFatherName.BackColor = vbRed .txtFatherName.SetFocus ValidEntry = False Exit Function End If 'Validating DOB If Trim(.txtDOB.Value) = "" Then MsgBox "DOB is blank. Please enter DOB.", vbOKOnly + vbInformation, "Invalid Entry" .txtDOB.BackColor = vbRed ValidEntry = FalseUserForm6 - 6 Exit Function End If 'Validating Gender If .optFemale.Value = False And .optMale.Value = False Then MsgBox "Please select gender.", vbOKOnly + vbInformation, "Invalid Entry" ValidEntry = False Exit Function End If 'Validating Course If Trim(.cmbCourse.Value) = "" Then MsgBox "Please select the Course from drop-down.", vbOKOnly + vbInformation, "Course Applied" .cmbCourse.BackColor = vbRed ValidEntry = False Exit Function End If 'Validating Mobile Number If Trim(.txtMobile.Value) = "" Or Len(.txtMobile.Value) < 10 Or Not IsNumeric(.txtMobile.Value) Th en MsgBox "Please enter a valid mobile number.", vbOKOnly + vbInformation, "Invalid Entry" .txtMobile.BackColor = vbRed .txtMobile.SetFocus ValidEntry = False Exit Function End If 'Validating Email If ValidEmail(Trim(.txtEmail.Value)) = False Then MsgBox "Please enter a valid email address.", vbOKOnly + vbInformation, "Invalid Entry" .txtEmail.BackColor = vbRed .txtEmail.SetFocus ValidEntry = False Exit Function End If 'Validating Address If Trim(.txtAddress.Value) = "" Then MsgBox "Address is blank. Please enter a valid address.", vbOKOnly + vbInformation, "Invalid E ntry" .txtAddress.BackColor = vbRed ValidEntry = False Exit Function End If 'Validating Image If .imgStudent.Picture Is Nothing Then MsgBox "Please upload the PP Size Photo.", vbOKOnly + vbInformation, "Picture" ValidEntry = False Exit Function End If End With End Function Sub Submit_Data() Dim iRow As Long If frmDataEntry.txtRowNumber.Value = "" Then iRow = shDatabase.Range("A" & Rows.Count).End(xlUp).row + 1 ' Identify last blank row ElseUserForm6 - 7 iRow = frmDataEntry.txtRowNumber.Value End If With shDatabase.Range("A" & iRow) .Offset(0, 0).Value = "=Row()-1" 'S. No. .Offset(0, 1).Value = frmDataEntry.txtStudentName.Value 'Student's Name .Offset(0, 2).Value = frmDataEntry.txtFatherName.Value 'Father's Name .Offset(0, 3).Value = frmDataEntry.txtDOB.Value 'DOB .Offset(0, 4).Value = IIf(frmDataEntry.optFemale.Value = True, "Female", "Male") 'Gender .Offset(0, 5).Value = frmDataEntry.cmbCourse.Value 'Qualification .Offset(0, 6).Value = frmDataEntry.txtMobile.Value 'Mobile Number .Offset(0, 7).Value = frmDataEntry.txtEmail.Value 'Email .Offset(0, 8).Value = frmDataEntry.txtAddress.Value 'Address .Offset(0, 9).Value = frmDataEntry.txtImagePath.Value 'Photo .Offset(0, 10).Value = Application.UserName 'Submitted By .Offset(0, 11).Value = Format([Now()], "DD-MMM-YYYY HH:MM:SS") 'Submitted On 'Reset the form Call Reset_Form Application.ScreenUpdating = True MsgBox "Data submitted successfully!" End Sub Function Selected_List() As Long Dim i As Long Selected_List = 0 If frmDataEntry.lstDatabase.ListCount = 1 Then Exit Function ' If no items exist in List Box For i = 0 To frmDataEntry.lstDatabase.ListCount - 1 If frmDataEntry.lstDatabase.Selected(i) = True Then Selected_List = i + 1 Exit For End If Next i End Function End Function Sub Show_Form() frmDataEntry.Show End Sub Private Sub cmdLoadImage_Click() If Me.txtStudentName.Value = "" Then MsgBox "Please enter Student's first.", vbOKOnly + vbCritical, "Error" Exit Sub End If Call LoadImange End Sub Private Sub UserForm6_Initialize() Call Reset_Form End SubUserForm6 - 8 Private Sub cmdSubmit_Click() Dim i As VbMsgBoxResult i = MsgBox("Do you want to submit the data?", vbYesNo + vbQuestion, "Submit Data") If i = vbNo Then Exit Sub If ValidEntry Then Call Submit_Data End If End Sub Private Sub cmdReset_Click() Dim i As VbMsgBoxResult i = MsgBox("Do you want to reset the form?", vbYesNo + vbQuestion, "Reset") If i = vbNo Then Exit Sub Call Reset_Form End Sub Private Sub lstDatabase_DblClick(ByVal Cancel As MSForms.ReturnBoolean) If Selected_List = 0 Then MsgBox "No row is selected.", vbOKOnly + vbInformation, "Edit" Exit Sub End If Dim sGender As String 'Me.txtRowNumber = Selected_List + 1 ' Assigning Selected Row Number of Database Sheet Me.txtRowNumber = Me.lstDatabase.List(Me.lstDatabase.ListIndex, 0) + 1 'Assigning the Selected Reocords to Form controls frmDataEntry.txtStudentName.Value = Me.lstDatabase.List(Me.lstDatabase.ListIndex, 1) frmDataEntry.txtFatherName.Value = Me.lstDatabase.List(Me.lstDatabase.ListIndex, 2) frmDataEntry.txtDOB.Value = Format(Me.lstDatabase.List(Me.lstDatabase.ListIndex, 3), "dd-mmm-yyyy") sGender = Me.lstDatabase.List(Me.lstDatabase.ListIndex, 4) If sGender = "Female" Then frmDataEntry.optFemale.Value = True Else frmDataEntry.optMale.Value = True End If frmDataEntry.cmbCourse.Value = Me.lstDatabase.List(Me.lstDatabase.ListIndex, 5) frmDataEntry.txtMobile.Value = Me.lstDatabase.List(Me.lstDatabase.ListIndex, 6) frmDataEntry.txtEmail.Value = Me.lstDatabase.List(Me.lstDatabase.ListIndex, 7) frmDataEntry.txtAddress.Value = Me.lstDatabase.List(Me.lstDatabase.ListIndex, 8) frmDataEntry.imgStudent.Picture = LoadPicture(Me.lstDatabase.List(Me.lstDatabase.ListIndex, 9)) frmDataEntry.txtImagePath

LoadPicture(Me.lstDatabase.List(Me.lstDatabase.ListIndex, 9)) frmDataEntry.txtImagePath = Me.lstDatabase.List(Me.lstDatabase.ListIndex, 9) Me.cmdSubmit.Caption = "Update" MsgBox "Please make the required changes and Click on Update." End Sub Private Sub cmdDelete_Click() If Selected_List = 0 Then MsgBox "No row is selected.", vbOKOnly + vbInformation, "Delete"UserForm6 - 9 Exit Sub End If Dim i As VbMsgBoxResult Dim row As Long row = Me.lstDatabase.List(Me.lstDatabase.ListIndex, 0) + 1 i = MsgBox("Do you want ot delete the selected record?", vbYesNo + vbQuestion, "Delete") If i = vbNo Then Exit Sub ThisWorkbook.Sheets("Database").Rows(row).Delete Call Reset ' Refresh the controls with latest information MsgBox "Selected record has been successfully deleted.", vbOKOnly + vbInformation, "Delete" End Sub Private Sub cmdEdit_Click() If Selected_List = 0 Then MsgBox "No row is selected.", vbOKOnly + vbInformation, "Edit" Exit Sub End If Dim sGender As String Me.txtRowNumber = Me.lstDatabase.List(Me.lstDatabase.ListIndex, 0) + 1 'Assigning the Selected Reocords to Form controls frmDataEntry.txtStudentName.Value = Me.lstDatabase.List(Me.lstDatabase.ListIndex, 1) frmDataEntry.txtFatherName.Value = Me.lstDatabase.List(Me.lstDatabase.ListIndex, 2) frmDataEntry.txtDOB.Value = Format(Me.lstDatabase.List(Me.lstDatabase.ListIndex, 3), "dd-mmm-yyyy") sGender = Me.lstDatabase.List(Me.lstDatabase.ListIndex, 4) If sGender = "Female" Then frmDataEntry.optFemale.Value = True Else frmDataEntry.optMale.Value = True End If frmDataEntry.cmbCourse.Value = Me.lstDatabase.List(Me.lstDatabase.ListIndex, 5) frmDataEntry.txtMobile.Value = Me.lstDatabase.List(Me.lstDatabase.ListIndex, 6) frmDataEntry.txtEmail.Value = Me.lstDatabase.List(Me.lstDatabase.ListIndex, 7) frmDataEntry.txtAddress.Value = Me.lstDatabase.List(Me.lstDatabase.ListIndex, 8) frmDataEntry.imgStudent.Picture = LoadPicture(Me.lstDatabase.List(Me.lstDatabase.ListIndex, 9)) frmDataEntry.txtImagePath = Me.lstDatabase.List(Me.lstDatabase.ListIndex, 9) Me.cmdSubmit.Caption = "Update" MsgBox "Please make the required changes and Click on Update."student register form student name father name date of birthday O Optio course applied mobile number email adress adress femele male gender edit deleted student name father name date of birth day gender course applied

UserForm13 - 1 Private Sub CommandButton1_Click() End Sub Private Sub CommandButton10_Click() End Sub Private Sub CommandButton11_Click() End Sub Private Sub CommandButton12_Click() End Sub Private Sub CommandButton13_Click() End Sub Private Sub CommandButton14_Click() End Sub Private Sub CommandButton15_Click() End Sub Private Sub CommandButton16_Click() End Sub Private Sub CommandButton17_Click() End Sub Private Sub CommandButton18_Click() End Sub Private Sub CommandButton2_Click() End Sub Private Sub CommandButton20_Click() End Sub Private Sub CommandButton22_Click() End Sub Private Sub CommandButton23_Click() End Sub Private Sub CommandButton3_Click() End Sub Private Sub CommandButton4_Click() End Sub Private Sub CommandButton5_Click() End Sub Private Sub CommandButton6_Click() End SubUserForm13 - 2 Private Sub CommandButton8_Click() End Sub Private Sub CommandButton9_Click() End Sub Private Sub Frame1_Click() End Sub Private Sub Label1_Click() End Sub Private Sub TextBox1_Change() End Sub Private Sub UserForm_Activate() End Sub Private Sub

UserForm_AddControl(ByVal Control As MSForms.Control) End Sub Private Sub UserForm_BeforeDragOver(ByVal Cancel As MSForms.ReturnBoolean, ByVal Control As MSForms.Co ntrol, ByVal Data As MSForms.DataObject, ByVal X As Single, ByVal Y As Single, ByVal State As MSForms. fmDragState, ByVal Effect As MSForms.ReturnEffect, ByVal Shift As Integer) End Sub Private Sub UserForm_BeforeDropOrPaste(ByVal Cancel As MSForms.ReturnBoolean, ByVal Control As MSForms .Control, ByVal Action As MSForms.fmAction, ByVal Data As MSForms.DataObject, ByVal X As Single, ByVal Y As Single, ByVal Effect As MSForms.ReturnEffect, ByVal Shift As Integer) End Sub Private Sub UserForm_Click() End Sub Private Sub UserForm_DblClick(ByVal Cancel As MSForms.ReturnBoolean) End Sub Private Sub UserForm_Deactivate() End Sub Private Sub UserForm_Error(ByVal Number As Integer, ByVal Description As MSForms.ReturnString, ByVal S Code As Long, ByVal Source As String, ByVal HelpFile As String, ByVal HelpContext As Long, ByVal Cance lDisplay As MSForms.ReturnBoolean) End Sub Private Sub UserForm_KeyDown(ByVal KeyCode As MSForms.ReturnInteger, ByVal Shift As Integer) End Sub Private Sub UserForm_KeyPress(ByVal KeyAscii As MSForms.ReturnInteger) End Sub Private Sub UserForm_KeyUp(ByVal KeyCode As MSForms.ReturnInteger, ByVal Shift As Integer) End Sub Private Sub UserForm_MouseDown(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByV al Y As Single)UserForm13 - 3 End Sub Private Sub UserForm_MouseUp(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByVal Y As Single) End Sub Private Sub UserForm_QueryClose(Cancel As Integer, CloseMode As Integer) End Sub Private Sub UserForm_RemoveControl(ByVal Control As MSForms.Control) End Sub Private Sub UserForm_Resize() End Sub Private Sub UserForm_Scroll(ByVal ActionX As MSForms.fmScrollAction, ByVal ActionY As MSForms.fmScroll Action, ByVal RequestDx As Single, ByVal RequestDy As Single, ByVal ActualDx As MSForms.ReturnSingle, ByVal ActualDy As MSForms.ReturnSingle) End Sub Private Sub UserForm_Terminate() End Sub Private Sub UserForm_Zoom(Percent As Integer) End Sub this.textBox1.Text = ""; this.input = string.Empty; this.operand1 = string.Empty; this.operand2 = string.Empty;operand2 = input; double num1, num2; double.TryParse(operand1, out num1); double.TryParse(operand2, out num2); if (operation == '+') { result = num1 + num2; textBox1.Text = result.ToString(); } else if (operation == '-') { result = num1 - num2; textBox1.Text = result.ToString(); } else if (operation == '*') { result = num1 * num2; textBox1.Text = result.ToString(); } else if (operation == '/') { if (num2 != 0) { result =

num1 / num2; textBox1.Text = result.ToString(); } Else { textBox1.Text = "DIV/Zero!"; } textBox1.Text = result.ToString(); } Result = num1 + num2Label1 7 8 9 / 4 5 6

1 2 3 + 0 . c *

CommandButto CommandButton21 CommandBut

UserForm16 - 1 Private Sub Label1_Click() End Sub Private Sub Label17_Click() End Sub Private Sub Label6_Click() End Sub Private Sub Label7_Click() End Sub Private Sub Label8_Click() End Sub Private Sub Label9_Click() End Sub Private Sub ListBox1_Click() End Sub Private Sub MultiPage1_Change() End Sub Private Sub MultiPage2_Change() End Sub Private Sub ScrollBar1_Change() End Sub Private Sub SpinButton1_Change() End Sub Private Sub TabStrip1_Change() End Sub Private Sub TextBox1_Change() End Sub Private Sub TextBox10_Change() End Sub Private Sub TextBox11_Change() End Sub Private Sub TextBox12_Change() End Sub Private Sub TextBox13_Change() End Sub Private Sub TextBox15_Change() End Sub Private Sub TextBox16_Change()UserForm16 - 2 End Sub Private Sub TextBox17_Change() End Sub Private Sub TextBox18_Change() End Sub Private Sub TextBox19_Change() End Sub Private Sub TextBox2_Change() End Sub Private Sub TextBox3_Change() End Sub Private Sub TextBox4_Change() End Sub Private Sub TextBox6_Change() End Sub Private Sub TextBox7_Change() End Sub Private Sub TextBox8_Change() End Sub Private Sub TextBox9_Change() End Sub Private Sub UserForm_AddControl(ByVal Control As MSForms.Control) End Sub Private Sub UserForm_BeforeDropOrPaste(ByVal Cancel As MSForms.ReturnBoolean, ByVal Control As MSForms .Control, ByVal Action As MSForms.fmAction, ByVal Data As MSForms.DataObject, ByVal X As Single, ByVal Y As Single, ByVal Effect As MSForms.ReturnEffect, ByVal Shift As Integer) End Sub Private Sub UserForm_Click() End Sub Private Sub UserForm_Deactivate() End Sub Private Sub UserForm_Error(ByVal Number As Integer, ByVal Description As MSForms.ReturnString, ByVal S Code As Long, ByVal Source As String, ByVal HelpFile As String, ByVal HelpContext As Long, ByVal Cance lDisplay As MSForms.ReturnBoolean) End Sub Private Sub UserForm_KeyDown(ByVal KeyCode As MSForms.ReturnInteger, ByVal Shift As Integer) End Sub Private Sub UserForm_KeyPress(ByVal KeyAscii As MSForms.ReturnInteger)UserForm16 - 3 End Sub Private Sub UserForm_Layout() End Sub Private Sub UserForm_MouseDown(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByV al Y As Single) End Sub Private Sub UserForm_MouseUp(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByVal Y As Single) End Sub Private Sub UserForm_RemoveControl(ByVal Control As MSForms.Control) End Sub Private Sub UserForm_Resize() End Sub Private Sub UserForm_Terminate() End Sub Private Sub UserForm_Zoom(Percent As Integer) End Sub Function K_Rdiv1(R1, R2) ' Gain of resistor divider K_Rdiv1 = R2 / (R2 + R1) End FunctionFunction Tri_Wave(t, V1, V2, T1, T2) ' ********** ' Generate Triangle Wave ' ' t - time ' V1 - voltage level 1 (initial voltage) ' V2 - voltage level 2 ' T1 - period ramping from V1 to V2 ' T2 - period ramping from V2 to V1 '********** Dim t_tri, dV_dt1, dV_dt2 As Double Dim N As Single ' Calculate voltage rates of change (slopes) during T1 and T2 dV_dt1 = (V2 - V1) / T1 dV_dt2 = (V1 - V2) / T2 ' given t, how many full cycles have occurred N = Application.WorksheetFunction.Floor(t / (T1 + T2), 1) ' calc the time point in the current triangle wave t_tri = t - (T1 + T2) * N ' if during T1, calculate triangle value using V1 and dV_dt1 If t_tri <= T1 Then Tri_Wave = V1 + dV_dt1 * t_tri ' if during T2, calculate triangle value using V2 and dV_dt2 Else Tri_Wave = V2 + dV_dt2 * (t_tri - T1) End If given t, how many full cycles have occured N = Application.WorksheetFunction.Floor(t / (T1 + T2), 1) ' calc the time point in the current triangle waveUserForm16 - 4 t_tri = t - (T1 + T2) * N End FunctionIf t_tri <= T1 ThenElse Tri_Wave = V2 + dV_dt2 * (t_tri - T1) Tri_Wave = V1 + dV_dt1 * t_tri Function K_op_non(R1, R2) ' Op amp closed loop gain - non-inverting amplifier K_op_non = (R2 + R1) / R1 End Function Function SineWave(t, Vp, fo, Phase, Vdc) ' create sine wave ' phase in deg Dim pi As Double pi = 3.1415927 'Calc sine wave SineWave = Vp * Sin(2 * pi * fo * t + Phase * pi / 180) + Vdc End Function Function K_op_inv(R1, R2) ' Op amp closed loop gain - inverting amplifier K_op_inv = -R2 / R1 End Functionn Create custom VBA functions and algorithms. Increase your understanding of electronic circuit design and analysis. Explore topics such as basic circuits, waveform generators, ADCs, op amps, the Fourier Series and filters. voltage Vs voltage v1 voltage v2 k div "10" "10000"

10000 0,0005 voltage v0 verror error t1 5.000 0,00 0,0 t2 vp vdc fo Page1 Page2 Page1 Page2 Tab1 Tab2 inverter non inverter The gain (K = vo/vs) for each of these amp ok cancell next read

UserForm17 - 1 Private Sub Label4_Click() End Sub Private Sub TextBox16_Change() End Sub Private Sub TextBox17_Change() End Sub Private Sub TextBox18_Change() End Sub Private Sub TextBox19_Change() End Sub Private Sub TextBox2_Change() End Sub Private Sub TextBox20_Change() End Sub Private Sub TextBox21_Change() End Sub Private Sub TextBox23_Change() End Sub Private Sub TextBox24_Change() End Sub Private Sub TextBox26_Change() End Sub Private Sub TextBox27_Change() End Sub Private Sub TextBox29_Change() End Sub Private Sub TextBox3_Change() End Sub Private Sub TextBox31_Change() End Sub Private Sub TextBox33_Change() End Sub Private Sub TextBox35_Change() End Sub Private Sub TextBox36_Change() End Sub Private Sub TextBox5_Change()UserForm17 - 2 End Sub Private Sub TextBox7_Change() End Sub Private Sub TextBox8_Change() End Sub Private Sub TextBox9_Change() End Sub Private Sub UserForm_Activate() End Sub Private Sub UserForm_AddControl(ByVal Control As MSForms.Control) End Sub Private Sub UserForm_BeforeDragOver(ByVal Cancel As MSForms.ReturnBoolean, ByVal Control As MSForms.Co ntrol, ByVal Data As MSForms.DataObject, ByVal X As Single, ByVal Y As Single, ByVal State As MSForms. fmDragState, ByVal Effect As MSForms.ReturnEffect, ByVal Shift As Integer) End Sub Private Sub UserForm_BeforeDropOrPaste(ByVal Cancel As MSForms.ReturnBoolean, ByVal Control As MSForms .Control, ByVal Action As MSForms.fmAction, ByVal Data As MSForms.DataObject, ByVal X As Single, ByVal Y As Single, ByVal Effect As MSForms.ReturnEffect, ByVal Shift As Integer) End Sub Private Sub UserForm_Click() End Sub Private Sub UserForm_DblClick(ByVal Cancel As MSForms.ReturnBoolean) End Sub Private Sub UserForm_Deactivate() End Sub Private Sub UserForm_Error(ByVal Number As Integer, ByVal Description As MSForms.ReturnString, ByVal S Code As Long, ByVal Source As String, ByVal HelpFile As String, ByVal HelpContext As Long, ByVal Cance lDisplay As MSForms.ReturnBoolean) End Sub Private Sub UserForm_Initialize() End Sub Private Sub UserForm_KeyPress(ByVal KeyAscii As MSForms.ReturnInteger) End Sub Private Sub UserForm_KeyUp(ByVal KeyCode As MSForms.ReturnInteger, ByVal Shift As Integer) End Sub Private Sub UserForm_MouseDown(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByV al Y As Single) End Sub Private Sub UserForm_MouseUp(ByVal Button As Integer, ByVal Shift As Integer, ByVal X As Single, ByVal Y As Single)UserForm17 - 3 End Sub Private Sub UserForm_RemoveControl(ByVal Control As MSForms.Control) End Sub Private Sub UserForm_Scroll(ByVal ActionX As MSForms.fmScrollAction, ByVal ActionY As MSForms.fmScroll Action, ByVal RequestDx As Single, ByVal RequestDy As Single, ByVal ActualDx As MSForms.ReturnSingle, ByVal ActualDy As MSForms.ReturnSingle) End Sub Private Sub UserForm17_Terminate() End Sub End Subtshingombe fiston Jul 23, 2025, 3:10 PM (2 days ago) to me Qeios Peer-approved Preprints Archive About Ethics Plans Sign Up Free Log in Views 4,047 Downloads 314 Peer Reviewers 29 Citations 0 Article has an altmetric score of 2 Make Action PDF Field Computer Science Subfield Information Systems Open Peer Review Preprint 2.79 | 29 peer reviewers Research Article Dec 11, 2023 https://doi.org/10.32388/JGU5FH Web-Based Crime Management System for Samara City Main Police Station Demelash Lemmi Ettisa1, Minota Milkias2 Abstract Crime is a human experience, and it must be controlled. The Samara town police station plays a signifi cant role in controlling crime. However, the management of crime activities is done manually, which is due to the lack of an automated system that supports the station workers in communicating with citize ns to share information and store, retrieve, and manage crime activities. To control crime efficiently , we need to develop online crime management systems. This project, entitled "Web-Based Crime Management System," is designed to develop an online applicati on in which any citizen can report crimes; if anybody wants to file a complaint against crimes, they m ust enjoy online communication with the police. This project provides records of crimes that have led UserForm17 - 4 to disciplinary cases in addition to being used to simply retrieve information from the database. The system implemented is a typical web-based crime record management system based on client-server archit ecture, allowing data storage and crime record interchange with police stations. Corresponding author: Demelash Lemmi Ettisa, nicemanyes@su.edu.et Chapter One

1. Introduction to the Study The "Crime Management System" is a web-based website for online complaining and computerized managemen t of crime records (Khan et al., 2008). A criminal is a popular term used for a person who has committed a crime or has been legally convicted of a crime. "Criminal" also means being connected with a crime. When certain acts or people are invol ved in or related to a crime, they are termed as criminal (Wex, 2023). Samara City 's main police station is located in Samara

City, within the Afar Regional State. It was e stablished in 1984 E.C. with the purpose of protecting local communities from criminal activities. The Samara City police station is situated near the diesel suppliers in Samara City. In the first phase, there was a small number of police members, including commanders, inspectors, and constables. But rece ntly, more than 170 police members have been employed. It is a well-organized police station that serv es in crime prevention; the detection and conviction of criminals depend on a highly responsive manner . The effectiveness of this station is based on how efficient, reliable, and fast it is. As a conseque nce, the station maintains a large volume of information. To manage their information requirements, th e station is currently using an information system. This system is manual and paper-based, where infor mation is passed hand-to-hand, and information is kept in hard-copy paper files stored ordinarily in f ili g cabinets. Despite the relevance of their information system, it poses several challenges in the mana gement of information, including an ever-increasing paper load, difficulty in enforcing file access co ntrols, and cases of missing files and information. To have a peaceful life, we need a well-organized law enforcement system. In our city, Samara, we have very good facilities in the law enforcement sector. However, due to a lack of facilities, some work c annot be done in a very good way. The widely employed CMS method in Samara City is the manual process. This approach entails the use of paper files in the documentation of criminal information. For this r eason, a website will be produced for the Crime Management System. The main authority is given to the administrator. Next is the main module of the system, which is the crime module. In this way, all the crime information will be stored in the database. First, complaint details will be added to the system , and then station employees will check if the complaint is related to a crime or law and order. The r esearcher focuses on a crime management system to provide services based on a computerized or web-base d system for the main police station in Samara. It also emphasizes computerized work on many activitie s, especially recording and reporting crime information. The researcher will help to facilitate an easy c rime management system by making it reliable and efficient by implementing the loss of many crime work s means web-based through the crime parts of the Samara City main police station. The aim of the proposed system is to develop a system with improved facilities. The proposed system ca n overcome all the limitations of the existing system. The system provides proper security and reduces manual work. Security of data. Minimize manual data entry. Better service. User-friendly and interactive. Minimum time required. Changing the manual system into an automated system. 1.1. Statement of the Problem The police station record management system is a project designed with the aim of maintaining all the records and details related to a police station in order to increase efficiency. As a result of making it easier to manage and administer a police station, this record management system makes the manageme nt and administration of a police station easier and more effective. Every country has always placed t he safety and protection of human rights at the top of its priorities, since without them no country c an exist. It is the responsibility of every country's government to protect the freedom and rights of all human beings without discrimination so that every individual can lead his life with his own choice without violating the rules and regulations set by the government of that country (Fluchtplan erstell en, 2023). The existing system of the Samara Police Station crime record management is a manual system. With the existing system, all activities are performed manually; there is no computerized system like a databas e or website. Files are manually stored, moved, and processed from one section to another. Reports are manually prepared and delivered to the appropriate unit. In the existing system, it's very difficult to retrieve any record information because different records are written in paper-based books or agendUserForm17 - 5 as. The problems in the existing system are: Limitations on crime recording: Recording crime information manually. Limitation on System Retrievals: The information is very difficult to retrieve, and finding partic ular information, like searching for crime detail information, is challenging. Problem with information storage: The information generated by various transactions takes time and effort to be stored in the right place. Problems with updating records: Various changes to information, like crime details, are difficult to update. More manpower required: Many police officers are needed to handle crime. Time-consuming: It is time-consuming to record crime. Consumes a large volume of paperwork: it requires much paper to record a crime file. Lack of security and space: There is no security for data because it is paper-based and has no pas sword. Report generation latency: There is an overlap of crime records from others. Poor inter-station sharing and connectivity. Therefore, the main objective of this project was to solve the entire above-mentioned problem by devel oping a web-based crime management system for the Samara city

police station. 1.2. Objective 1.2.1. General Objective The general objective of the project is to develop a web based crime management system for samara city main police station. 1.2.2. Specific Objectives The specific objectives for our project are: Make a plan for how to carry out our project accordingly. Gather or collect data. Analyze the gathered data. Design the system based on the specified requirements. Develop an interactive user interface. Identify the functional and non-functional requirements. Implement the system based on the system design. Test to check the availability of the project. Finally, deploy the system in the working environment. 1.3. Significance of the System The significance of this project will be: Providing a web-based crime reporting system for police stations. Reducing errors by suggesting appropriate actions for the recorded personal data. Giving efficient service within the time limit. Effective manipulation in terms of cost. Ease of use, updating, and maintenance. Facilitating the accessibility of information. 1.4. Data gathering To gather accurate data from the concerned body, the researcher used the following fact-finding techni ques: Interview: In order to gather complete and appropriate information for the proposed project, the t eam selected a person to interview about the organization, consisting of inspectors and secretaries, t o get necessary information that is stated in the background of the project, like the existing problem s and costs, such as salary. Document Analysis: To get historical information about the organization's activities and to know t he organization's rules and regulations, the team tried to analyze as many documents as possible that were relevant to the new system. Observation: To get first-hand, accurate information about how the existing system works, the team observed the current system directly and found the pros and cons of the present system. 1.5. Design Methodology The team decided to use object-oriented methodology (a system development approach that allows the reu se of existing components) for the following reasons: It is known to the group members. It is easier to maintain. There is ease of understanding object-oriented models due to a consistent underlying representatio n throughout the development process.UserForm17 - 6 There is ease of modification and extensibility of object-oriented models. There is no separation between data and processes, unlike in structured analysis methodology, whic h treats data and processes separately. From the development method, we would use prototyping, and from the testing method, we would use i ntegration and system testing. design Tools: Deployment Diagram Design class diagram 1.5.1. Analysis Methodology The analysis approach used is object-oriented analysis (OOA). This method was selected because "object - oriented analysis is a method of analysis that examines requirements from the perspectives of the cla sses and objects found in the vocabulary of the problem domain." The primary tasks in object-oriented analysis (OOA) are identifying objects, organizing the objects by creating an object-oriented model di agram, and defining the behavior of the objects. Here, common models used in OOA are use cases and obj ect models. The team looked at the problem domain with the aim of producing a conceptual model of the information that exists in the area that will be analyzed. The team selected users who use the system and tried to refine how the users communicate with each other. This model includes the functions of the system (us e case modeling), identifies the business objects, organizes the objects, and also the relationships b etween them, and finally models the behavior of the objects. Analysis Tools: Class Diagram Use case diagram Sequence Diagram Activity Diagram 1.5.2. Hardware and Software to Be Used for Implementation The software requirements specification is the single most important document in the software developm ent process. The following are software requirements: XAMPP Server, MySQL, Editor, Edraw Max and Microsoft Office Visio, Browser, Microsoft Office Word 2010, Microsoft PowerPoint 2010. Hardware requirements are the tangible and visible components that are necessary to develop a system. Hardware Tools that were used to develop this project are: Computers, Flash Disk (8GB), Pen and Paper, Mobile, Camera, Hard Disk. Chapter Two

2. System Modeling System modeling is the process of developing abstract models of a system, with each model presenting a different view or perspective of that system. It is about representing a system using some kind of gr aphical notation, which is now almost always based on notations in the Unified Modeling Language (UML) . Models help the analyst to understand the functionality of the system and are used to communicate wi th customers. 2.1. Use Case Identification A use case describes the functionality that a system is supposed to perform or shows by modeling. Each use case describes a possible scenario of how the external entity interacts with the system. That mea ns it interacts with the entire system for external users. In modeling use cases, each use case descri bes the interaction between the actors within the system boundary. A Use Case describes the sequence o f actions that provides a measurable value to

an actor, is drawn as a horizontal ellipse, and contains the use case name inside the ellipse. In the following table, we attempt to list the use case ID, the use case name, and its description. Use case ID Use case Name Include/ Uc1 Create Account Login Uc2 View User Account Login Uc3 Update account Login Uc4 View user Activities Login Uc5 Take backup Login Uc6 Restore backup Login Uc7 Assign placement for police Login Uc8 View employee LoginUserForm17 - 7 Uc9 View comment Login Uc10 View nomination Login Uc11 Post missing criminals Login Uc12 Post notice Login Uc13 View criminal report Login Uc14 View placement Login Uc15 Register criminal Login Uc16 View nomination Login Uc17 Send account request for complaint Login Uc18 View order Login Uc19 View complaint request Login Uc20 View criminal Login Uc21 Register complaint Login Uc22 Order preventive police Login Uc23 Register witness Login Uc24 Register Accused Login Uc25 Register Accuser Login Uc26 Register first information report Login Uc27 Order preventive police Login Uc28 Register employee Login Uc29 Update employee Login Uc30 View employee Login Uc31 Send complain Login Uc32 View complain response Login Uc33 View missing criminal ---------- Uc34 Give nomination ---------- Uc35 Give comment ---------- Uc36 Login ---------- Uc37 Logout Login Table 1. Use Case Identification 2.2. Use Case Diagram A UML use case diagram shows the relationships among actors and use cases within a system. A use-case diagram is a graphic representation of the interactions among the elements of a system. Use case diagr ams show the various activities the users can perform on the system. The system is something that perf orms a function. They model the dynamic aspects of the system. It deals with who uses your application or system and what they can do with it A use case diagram contains the following sub-components: System boundary: which defines the system of interest in relation to the world around it. Actors: An actor is an entity that initiates the use case from outside the scope of the use case. It can be any element that can trigger an interaction with the use case. Define the roles that users o r other systems play while interacting with the system. It is usually individuals involved with the system defined according to their roles. The relationship: Communication associations connect actors with the use cases in which they participa te. Relationships among use cases are defined by means of including and extending relationships. It is a connection between the actors and the use cases. The Include Relationship (<> or <>) represents the inclusion of the functionality of one use case within another. The arrow is drawn from the base use case to the used use case. The Extend Relationship (<>) represents the exte nsion of the use case to include optional functionality. Use Case: are the specific roles played by the actors within the system 2.2.1. Actor Specification This part describes who the actors are and what their role is in the system. In the proposed system, t here are eight actors who are participating. The following are the actors in the proposed system: System Administrator: An administrator who interacts with the proposed system and has full control ove r the system. After logging in to the system, their responsibilities include: View User Account Update account View User Activities Restore backup Create account View Employee Take backupUserForm17 - 8 Police Head: Has the following activities: Assign placement for preventive police View Employee View nomination View missing criminal Create account View Comment Post missing criminals View Criminal Report Criminal Preventive Police: Have the following activities: View their Placement assigned by police head Register Criminal Register Complaint Register Crime View complaint request View nomination View notice Send nomination View Order Detective Officer: Have the following activities: View Criminal Order preventive police Register witness Register accused Register accuser View witness View accused View accuser Generate First Information Report Human Resource Manager: Have the following activities: Register Employee View Employee Update Employee Customer: Have the following activities: View Missing Criminal Give nomination Give Comment Complaint: Have the following activities: Send request View response 2.2.2. Use Case Description A use case description is a business analysis presentation of the steps defining the interactions betw een a user (called an actor) and a system (usually a computer system). It details the interactions and sets expectations for how the user will work within the system. Use Case Name Register Employee Use Case ID Uc28 include Login Actor Human resource manager Description The human resources manager accepts the user and registers them for the database in the sy stem. Precondition The users should be workers at the police station. Basic course of Action Actor Action

3. HR manager opens the system.
4. HR manager, click on the Register Employee Link.
5. Fill each individual field and press the register button.UserForm17 - 9

6. Use case end System response
7. The system opens to the user page.
8. The system displays a user registration form.
9. If the user correctly fills each required field the system will display the "You are Successfully R egistered" message. Alternative course of action If the HR manager enters the wrong username or password, the system displays "Incorrect input, " and the process turns again from step 5. Post condition Employees are legal users of the station. Table 2. Register Employee use case description Use Case Name Create Account Use Case ID Uc1 include Login Actor Administrator Description Administrators create accounts for already-registered users. Precondition Administrators must login and should get a list of users' information from registered users. Basic course of Action Actor Action
10. Administrator Login to the system
11. Click on the Create Account Link.
12. The administrator fills out the field, including the user name and password, then clicks on the Cre ate Account button.
13. Use case-end. System response
14. The system opens to the Administrator page.
15. The system displays Create Account form
16. If the entered data is valid, the system will display the "You have successfully created an account " message. Alternative course of action If the user enters the wrong username or password, the system displays an invalid input message and processes it again from step 4. Post condition Users can login to the system with their account. Table 3. Create Account use case description Use Case Name Login Use Case ID Uc36 Include ----- Actor Police Head, Preventive Police, Detective Officer, Human Resource Manager, Administrator, and Complaint. Description This use case is used to ensure security for system usage. Only legal users can access the system. Precondition The user must have a valid user name and password from Administrator. Basic course of Action Actor Action
17. the user opens the system.
18. User-Click Login Menu
19. The user fills out the form and clicks the login button.
20. Use case-end UserForm17 - 10 System response
21. The system displays the Home Page.
22. The system displays the login form.
23. System displays user page Alternative course of action The user may input the wrong user name and password and the system will display the wrong message. The process turns back to step 5. Post condition Users perform their own tasks on the system. Table 4. Login use case description Use Case Name Register Accused Use Case ID Uc24 include Login Actor Detective Officer Description A detective officer can register the accused criminal to make a decision. Precondition The detective officer must have a valid user name and password to register the accused criminal. Basic course of Action Actor Action
24. The user logs into the system.
25. Detective Officer, click the Register accused criminal link.
26. Fill out the form and click the Register button.
27. Use case-end. System response
28. The user inputs the correct value, and the system displays Detective Officer Page.
29. The system displays an accused criminal register form.
30. The system displays a successful message. Alternative course of action The user may input the wrong user name and password, and the system will show an incorrect message. The process turns back to step 1. Post condition Logout from the system.. Table 5. Register Accused use case description Use Case Name Assign placement for police Use Case ID Uc7 include Login Actor Police Head Description Police Head: Assign police to their working place. Precondition The police head must have a valid user name and password to assign police to their tas k. Basic course of Action Actor Action

31. The police head logged in to the system.
32. The user clicks Assign Link.
33. Then fill out the form and click the Assign button. System response
34. System directs to police head page
35. The system opens the form.UserForm17 - 11
36. system display successfully message
37. Use case-end. Alternative course of action A1. The police head may input the wrong user name and password, and the system will show an incorrect message. The process turns back to step 1. A2. If the police chief enters incorrect information, the system displays an incorrect message. The process turns back to step 5. Post condition User's logout from the system. Table 6. Assign Police use case description Use Case Name Post Missing Criminals Use Case ID Uc11 include Login Actor Police Head Description Police Head post the missing criminal on the home page and get a nomination from the citiz en. Precondition There must have been a missing criminal nominated by the people, and The police head must have a valid user name and password to post. Basic course of Action Actor Action
38. The police head logged in to the system.
39. The police head clicks on the post-missing criminal link.
40. The police head uploaded a missing criminal file.
41. Use case-end. System response
42. system directs to the police head page.
43. The system displays browsing Button.
44. The system displays "the missing criminal successfully posted" message. Alternative course of action A1. If the user enters the wrong username or password, the system noti fies "the wrong input" and the process continues from step 1. Post condition User's logout from the system. Table 7. Post Missing Criminals use case description Use Case Name Send complain Use Case ID Uc31 include Login Actor Complaint Description The complainant sends their complaint to the preventive police, and the preventive police examine it and send a response to the complaint. Precondition The customer knows how to use the system. Basic course of Action Actor Action
45. The complaint logged in to the system.
46. Fill out the complaint form and submit it.
47. The complainant fills out the form and sends a request.
48. Use case-end. UserForm17 - 12 System response
49. The system directs to the complaint page.
50. The system displays the form.
51. The system displays a "successfully" message. Alternative course of action A1. If the user enters the wrong username or password, the system noti fies "the wrong input, " and the process continues from step 1. Post condition user's logout from the system. Table 8. Send Complaint use case description 2.3. Sequence Diagram A sequence diagram is a kind of interaction diagram that shows how processes operate with one another and in what order in a system. It shows object interactions arranged in a time sequence. UML sequence diagrams model the flow of logic within your system in a visual manner, enabling you to both document and validate your logic. They are commonly used for both analysis and design purposes. Sequence diagra ms are the most popular UML artifact for dynamic modeling, which focuses on identifying the behavior w ithin your system. UML Sequence Diagrams Description Capture the interaction between objects in the context of a collaboration. Show object instances that play the roles defined in a collaboration. Show the order of the interaction visually by using the vertical axis of the diagram to represent time, what messages are sent, and when. Show elements as they interact over time, showing interactions or interactions, for instance. Figure 1. Sequence diagram for User LoginFigure 2. Sequence diagram for Give NominationFigure 3. Seque nce diagram for Assign PoliceFigure 4. Sequence diagram for Update User ProfileFigure 5. Sequence diag ram for Posts Missing CriminalFigure 6. Sequence diagram for Register EmployeeFigure 7. Sequence diagr am for View Accused Criminal 2.4. Class Diagram This class diagram shows the detailed associations and attributes of the proposed system.

A class diag ram in the Unified Modeling Language (UML) is a type of static structure diagram that describes the st ructure of a system by showing the system's classes, Objects their Attributes Operations (methods) And the relationships among the classes A class diagram is an illustration of the relationships and source code dependencies among classes in the Unified Modeling Language (UML). It provides an overview of the target system by describing the ob jects and classes within the system and the relationships between them. Figure 8. Crime Management Class Diagram Chapter Three

52. System Design System design is the transformation of the analysis model into a system design model. System design is the first part to get into the solution domain in software development. This chapter focuses on trans forming the analysis model into a design model that takes into account the non-functional requirements and constraints described in the problem statement and requirement analysis sections discussed earlie r. 3.1. Design Goal The objectives of design are to model the system with high quality. The design goals are derived from non-functional requirements, which means a non-functional requirement is the description of the featur e characteristics and attributes of the system as well as any constraints that may limit the boundary of the proposed solution. 3.2. System Decomposition To reduce the complexity of the solution domain, we decompose a system into simpler parts, called subs ystems, which are made of a number of solution domain classes. In the case of complex subsystems, we r ecursively apply this principle and decompose a subsystem into a set of loosely dependent parts that m ake up the system. Subsystem decomposition is the way that helps us to distinguish the parts of the op erations that take place within the organization Figure 9. System decomposition 3.3. System Architecture The purpose of design is to show the direction in which the application is being developed and to obta in clear and sufficient information needed to derive the actual implementation of the application. The work is based on the services provided on the internet to customers. Once the services are available UserForm17 - 13 based on customer requests, they will be delivered with specific privileges to access, receive, and vi sit the site. The architecture used for the system is a client-server architecture where a client can use internet browsers to access the web-based crime file management system within the local area netwo rk of the agency or anywhere using the internet. It stores this data in a relational database manageme nt system. The middle tier (web/application server) implements the business logic, controller logic, a nd presen

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