Timings:

Day 1

9.30 Introduction of self and course

Going to be mixture of talking and doing – lots of practise!

9.40 Introduction to the MATLAB desktop

Run up Matlab

Slide 2 Description of windows

Slide 3 Setting up workspace

Try for few minutes

9.45 Slide 4 Variables Show creating a variable – don’t need to declare

Stress all data stored as arrays MATrix LABoratory

Show variable in workspace – default to double

Slide 5 Strings

Slide 6 Variable display format

Slide 7 Variable names

Try creating variable – look at it in workspace.

Try creating string

Slide 8 Saving workspace data

9:50 Slide 9 Creating vectors

Colon operator

Slide 10 Linspace & logspace functions

Slide 11 Column vectors

Semicolon to separate rows

Transpose operator

Slide 12 Indexing vectors

Subscript notation – note starts from 1

Use of end operator

Replacing given elements using expression on left hand side

10:00 Exercise 2.1

Slide 13 Answers

10.10 Slide 14 Arithmetic operators

Slide 15 Order of Precedence

Slide 16 Addition and subtraction operations

Start to emphasise vectorization and avoidance of loops

Matlab array operations optimised

Slide 17 Multiplication based operations - scalars

Slide 18 Multiplication based operations - dot operators

Slide 19 Multiplication based operations - Matrix multiplication

Slide 20 Vectors as function input

10.20 Exercise 2.2

Slide 21,22 Answers

Slide 23 Left division

Slide 24 Solving simultaneous equations using left division

Slide 25 Matrices

10:35 Exercise 2.3

Slide 26 Answers

10:45 Coffee

11:00 Slide 27 Character matrices

Slide 28 Char function

Slide 29 Matrix subscript notation

Slide 30 Linear indexing

Slide 31 Combining matrices

Slide 32 Matrix functions

Size, length operators

Slide 33 Automatically generated matrices

Slide 34 Matrix memory management – preallocation

Slide 35 Sparse matrices

11.15 Exercise 2.4

Slide 36,37 Answers

11.30 Slide 38 Scripts –

Slide 39 Simple user input

Slide 40 Output – disp

Slide 41 Output – compound strings

11:45 Slide 42 Work through freefall example

Slide 43 Blank – work through how to plan – pseudocode

Slide 44 Exercise 4.1

Slide 45 Blank

Slide 46 Flowchart

12:30 Lunch

1:30 Slide 47 Simple x-y plot including from workspace

Slide 48 Plot from workspace

1:45 Exercise 5.1

2:00 Slide 49 Annotating Figures

Plot tools

Slide 50 Multiple lines on one figure

Multiple figures

Slide 51 Subplots

Slide 52 Saving figures

2:15 Slide 53 Exercise 5.2

2.30 Get them to think of problems with program

Importance of being able to debug effectively and not assuming that, just because program runs that the answers are correct

Slide 54 Syntax errors – use the error bar in the edit window

Runtime errors – watch for Inf

Slide 55 Learn to use the debugger – whatever language you’re using.

Show how to use the debugger

2.50 Slide 56 Code sections

Exercise 6.1 Debugging example containing bugs

3:00 Exercise 6.2

Coffee

3:15 Slide 57 Program structure

Slide 58 Relational and logical operators, logical data type

Slide 59 Comparing matrices

Slide 60 Logical operators on matrices and using as mask

Slide 61 More logical indexing

Slide 62 find() and logical functions

Slide 63 Using tolerance when comparing floats

3:45 Exercise 8.1 Slide 64 Answers

+ time to complete exercises

Day2

9:30 Slide 65 Conditional statements, if statements

Stress indentation for clarity

Slide 66 Nested if, good practise to indent

Slide 67 if/else

9:40 Exercise 8.2

Slide 68 if/elseif/else

Slide 69 if/elseif/else continued

10:00 Exercise 8.3

10:20 Slide 70 switch with menu example

10:30 Slide 71 Repetition operators:

Slide 72 for loop – example of using for i = 1:5 eg

Stress that little need for for loops in MATLAB

Nested loops and why shouldn’t need to use much

Show using increment eg for i = 1:0.1:5

Slide 73 for loop - Using vector for i = [1 3.4 7]

2D matrix index

Slide 73 while loop

Early loop termination

Slide 74 tic/toc

10:40 Exercise 9.1

11:00 Coffee

11:15 Slide 75 While loop

Slide 76 Exercise 9.2

11:35 Slide 77 Function – created in separate .m file

Format

Slide 78 Calling functions

DistBetweenPoints function

Slide 79 Passing arrays to functions

Use .\* etc in function

11:45 Exercise 10.1

12:15 Slide 80 Subfunctions

Slide 81 Anonymous functions

Slide 82 Function functions

Slide 83 Persistent variables

12:30 Lunch

1:30 Exercise 10.2 Slide 83

1:45 Slide 85 Import wizard - either select Import Data or use uiimport command

Demo importing section0.txt and section0column.txt

Import SimonVega.jpg

Slide 93 Show Section0.txt using importdata and resulting structure

Also see textscan

Slide 86 Cleaning data

2:00 Exercise 11.1

?? Structures & code cells?

2:15 Slide 87 Feedback

3:10 Slide 88 Publishing Show video

3:15 Slide 89 Conclusion – what else available in MATLAB etc

3:20 Time to finish examples