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|  | **Faculty of Computing, Engineering and Science** | Final mark awarded:\_\_\_\_\_ |

**Assessment Cover Sheet and Feedback Form 2017/18**

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| **Module Code: NG4S804** | **Module Title:**  **Applied DSP** | | **Dr Roula** |
| Assessment Title and Tasks: DFT and frequency analysis | | | Assessment No.  e.g. 1 of 1 |
| No. of pages submitted in total including this page:  Completed by student | | | Word Count of submission  (if applicable): Completed by student |
| Date Set:  25/10/2017 | | Submission Date:  15/12/2017 | Return Date:  12/01/2018 |

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| ***Part A: Record of Submission (to be completed by Student)*** | |
| **Extenuating Circumstances**  If there are any exceptional circumstances that may have affected your ability to undertake or submit this assignment, make sure you contact the Advice Zone on your campus prior to your submission deadline. | |
| **Fit to sit policy**:  The University operates a fit to sit policy whereby you, in submitting or presenting yourself for an assessment, are declaring that you are fit to sit the assessment. You cannot subsequently claim that your performance in this assessment was affected by extenuating factors. | |
| **Plagiarism and Unfair Practice Declaration:**  By submitting this assessment, you declare that it is your own work and that the sources of information and material you have used (including the internet) have been fully identified and properly acknowledged as required[[1]](#footnote-1). Additionally, the work presented has not been submitted for any other assessment. You also understand that the Faculty reserves the right to investigate allegations of plagiarism or unfair practice which, if proven, could result in a fail in this assessment and may affect your progress. | |
| **Intellectual Property and Retention of Student Work:**  You understand that the University will retain a copy of any assessments submitted electronically for evidence and quality assurance purposes; requests for the removal of assessments will only be considered if the work contains information that is either politically and/or commercially sensitive (as determined by the University) and where requests are made by the relevant module leader or dissertation supervisor. | |
| **Details of Submission:**  Note that all work handed in after the submission date and within 5 working days will be capped at 40%[[2]](#footnote-2). No marks will be awarded if the assessment is submitted after the late submission date unless extenuating circumstances are applied for and accepted (Advice Zone to be consulted). | |
| You are required to acknowledge that you have read the above statements by writing your student number(s) in the box: | Student Number(s): |

**IT IS YOUR RESPONSIBILITY TO KEEP RECORDS OF ALL WORK SUBMITTED**

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| **Part B: Marking and Assessment**  **(to be completed by Module Lecturer)** |
| This assignment will be marked out of 100%  This assignment contributes to 40% of the total module marks.  This assignment is bonded Details : |
| **Assessment Task:**  See below |
| **Learning Outcomes to be assessed** (as specified in the validated module descriptor <https://icis.southwales.ac.uk/> ): |
| **Grading Criteria:**  **Part 1**  **Execution 20**  **Analysis 25**  **Part 2**  **Execution 20**  **Analysis 25**  **Report quality 10** |
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| **Feedback/feed-forward** (linked to assessment criteria):   * Areas where you have done well: * Feedback from this assessment to help you to improve future assessments: * Other comments | | |
| **Mark:** | **Marker’s Signature:** | **Date:** |
| **Work on this module has been marked, double marked/moderated in**  **line with USW procedures.** | | |
| *Provisional mark only: subject to change and / or confirmation by*  *the Assessment Board* | | |

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| **Part C: Reflections on Assessment**  **(to be completed by student – optional)** | |
| **Use of previous feedback:**  In this assessment, I have taken/took note of the following points in feedback on previous work: | |
| **Please indicate which of the following you feel/felt applies/applied to your submitted work**   * A reasonable attempt. I could have developed some of the   sections further.   * A good attempt, displaying my understanding and learning, with   analysis in some parts.   * A very good attempt. The work demonstrates my clear   understanding of the learning supported by relevant literature and scholarly work with good analysis and evaluation.   * An excellent attempt, with clear application of literature and   scholarly work, demonstrating significant analysis and evaluation. | |
| **What I found most difficult about this assessment:** |  |
| **The areas where I would value/would have valued feedback:** |  |

**APPLIED DIGITAL SIGNAL PROCESSING**

**ASSIGNMENT 1**

In this assignment, you will write a stand-alone DSP application in the C programming language or similar.

The overall purpose of the application is to apply the discrete Fourier transform (DFT) and to understand the process of digital filtering using convolution and recursively.

**Part1**

For this application we will assume a **sampling frequency of 15 kHz**.

1-      Perform a 256 point discrete Fourier transform (DFT) on the following wave forms.

(a)     A sine wave of peak amplitude 10 and frequency 2 kHz.

(b)    A mixture of 3 sine waves of peak amplitude 10 and frequencies 500 Hz, 1kHz, 2kHz respectively.

(c)     A square wave of frequency 500Hz whose amplitude alternates between 0 and 20.

Show how you carried out your implementation. After the program has been executed, the results of the DFT should be printed out to the screen in **dB format**. Comment on your results.

**Part 2**

1. Repeat part 1 with a 512 point DFT. Comment on your results.
2. Implement the DFT of part 1 with Hann window. Comment on your results.
3. Research and compare 2 other windowing approaches.

1. University Academic Misconduct Regulations [↑](#footnote-ref-1)
2. Information on exclusions to this rule is available from the Advice Centre at each Campus [↑](#footnote-ref-2)