

**Department of Computing and Mathematics** **ASSIGNMENT COVER SHEET**

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| **Unit title:** | 6G7V0029 and 6G7V0003 Advanced Computer Networks |
| **Assignment set by:** | Muhammad **Atif** Ur Rehman |
| **Assignment ID:** | 1CWK80 |
| **Assignment title:** | A survey on a selected emerging topic in Advanced  Computer Networks |
| **Assessment weighting:** | 80% |
| **Type: (Group/Individual)** | Group/Individual |
| **Hand-in deadline:** | Fri, 12 Jan 2024, 21:00 |
| **Hand-in format and mechanism:** | A **report** (pdf) file submission via Moodle  **The report file slide must be named as follows:**  StudentID1-StudentID2-StudentID3\_Paper Title  For example  45462565-74342534-28452554\_A Survey of Security and Privacy Issues in the Internet of Things |

**Learning outcomes being assessed:**

**LO1:** Describe the architecture, protocols, and fundamental principles of emerging and future network technologies.

**LO2:** Build the working knowledge of various networking technologies' building blocks so that they can be applied to solve the problems of designing distributed systems over wired, wireless, and virtual networks.

**LO3:** Research and critically analyse the capabilities, limitations, security, and applications of emerging networking technologies.

**LO4:** Apply a wide range of transferable skills and attributes applicable to industry, research, and development projects.

**Note:** it is your responsibility to make sure that your work is complete and available for marking by the deadline.  Make sure that you have followed the submission instructions carefully, and that your work is submitted in the correct format, using the correct hand-in mechanism (e.g., Moodle upload).  If submitting via Moodle, you are advised to check your work after upload, to make sure it has uploaded properly. If submitting via OneDrive, ensure that your tutors have access to the work. Do not alter your work after the deadline.  You should make at least one full backup copy of your work.

**Penalties for late submission**

The timeliness of submissions is strictly monitored and enforced.

All coursework has a late submission window of 7 calendar days, but any work submitted within the late window will be capped at 50%, unless you have an agreed extension.  Work submitted after the 7-day late window will be capped at zero unless you have an agreed extension.  See ‘Assessment Mitigation’ below for further information on extensions.

**Please note that individual tutors are unable to grant extensions to assessments.**

**Assessment Mitigation**

If there is a valid reason why you are unable to submit your assessment by the deadline you may

apply for assessment mitigation. There are two types of mitigation you can apply for via the unit area on

Moodle (in the ‘Assessments’ block on the right-hand side of the page):

**Self-certification**: does **not** require you to submit evidence. It allows you to add a short extension to a deadline. This is not available for event-based assessments such as in-class tests, presentations, interviews, etc.  You can apply for this extension during the assessment weeks, and the request must be made **before** the submission deadline.

**Evidenced extensions:** requires you to provide independent evidence of a situation which has impacted you. Allows you to apply for a longer extension and is available for event-based assessment such as in-class test, presentations, interviews, etc.  For event-based assessments, the normal outcome is that the assessment will be deferred to the summer resit period.

Further information about Assessment Mitigation is available on the dedicated Assessments page: <https://www.mmu.ac.uk/student-life/course/assessments#ai-69991-0>

**Plagiarism**

Plagiarism is the unacknowledged representation of another person’s work, or use of their ideas, as one’s own. Manchester Metropolitan University takes care to detect plagiarism, employs plagiarism detection software, and imposes severe penalties, as outlined in the [Student Code of Conduct](https://www.mmu.ac.uk/student-case-management/guidance-for-students/student-code-of-conduct/) and [Taught Postgraduate Assessment Regulationshttps://www.mmu.ac.uk/student-life/course/assessments](https://www.mmu.ac.uk/student-life/course/assessments#ai-63930-1). Poor referencing or submitting the wrong assignment may still be treated as plagiarism. If in doubt, seek advice from your tutor.

**As part of a plagiarism check, you may be asked to attend a meeting with the Unit Leader, or another member of the unit delivery team, where you will be asked to explain your work (e.g. explain the code in a programming assignment).  If you are called to one of these meetings, it is very important that you attend.**

**If you are unable to upload your work to Moodle**

If you have problems submitting your work through Moodle, you can email it to the Assessment Team’s Contingency Submission Inbox using the email address [submit@mmu.ac.uk](mailto:submit@mmu.ac.uk).  You should say in your email which unit the work is for, and provide the name of the Unit Leader.  The Assessment team will then forward your work to the appropriate person. If you use this submission method, your work must be emailed **before the published deadline**, or it will be logged as a late submission.Alternatively, you can save your work into a single zip folder then upload the zip folder to your university OneDrive and submit a Word document to Moodle which includes a link to the folder.  **It is your responsibility to make sure you share the OneDrive folder with the Unit Leader, or it will not be possible to mark your work.**

**Assessment Regulations**

For further information see [Assessment Regulations for Undergraduate/Postgraduate Programmes of Study](https://www.mmu.ac.uk/student-life/course/assessments#ai-63930-2) on the [Student Life web pages](https://www.mmu.ac.uk/news-and-events/news/story/?id=16239).

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| **Assessment Criteria:** | Indicated in the attached assignment specification. |
| **Formative Feedback:** | You will receive formative feedback during presentation/coursework support lab sessions i.e., in Week 10 & 11. The aim of formative feedback is to help you write your final report well which constitutes 80% of the overall assessment weighting.  Please note that presentations constitute the remaining 20% of overall assessment weighting. Further details can be found in the  2CWK20 file. |
| **Summative Feedback Format:** | Feedback on your submitted survey paper will be provided via Moodle. |

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# Task Description

Your task is to work in **pairs (maximum 5)**, or **individually (in exceptional circumstances only)**, to write a survey paper that explores and critically analyses the state of the artwork currently being carried out in a specific area of advanced computer networks.

According to [ACM Computing Surveys,](http://surveys.acm.org/) a survey paper is defined as "A paper that summarises and organises recent research results in a novel way that integrates and adds understanding to work in the field. A survey article assumes that the reader has a general knowledge of the area; it emphasises the classification of the existing literature, developing a perspective on the area, and evaluating trends."

The survey paper should have the following structure:

* + **Title**: Indicates accurately the subject and scope of the study.
  + **Authors**: Names and affiliation.
  + **Abstract**: A concise description of your research article.
  + **Introduction**: Describes the scope, context, motivation, and significance of the research topic/ problem by summarising current understanding and background information about the topic/problem. It is expected that this section clearly states the aim of the conducted work in the form of the research question/problem supported by a hypothesis, explaining briefly the methodological approach used to examine it, highlighting the potential outcomes your study can reveal, and outlining the remaining structure and organisation of the paper.

## Survey body:

* + - Your critical analysis of the research in the studied topic/problem including the proposed new original classification and comparison of the reviewed papers. In addition, an overview of the major limitations identified and recommendations for future directions are expected.
    - **Proposal**: Pick one of the identified limitations in the reviewed works and propose an original idea (or at least an idea inspired by one or more of the studied works) to solve it. Alternatively, you can also highlight a new issue that has not been addressed/discovered in the literature yet and explain why addressing this issue is important.
    - **Evaluation (Experimentation/Simulation) Tools**: Brief details about various evaluation tools, including experimentation, simulation, or emulation tools, which are available, and pertinent to the selected survey topic, to evaluate networking performance.
  + **Conclusion**: A summary of your points or a re-statement of your research problem and synthesis of key points.
  + **References**: The sources of information used in your article.

Detailed guidance on researching and developing a survey paper will be provided in the first three lab sessions under the **“Research & Learning Focused”** module.

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# Choosing a Topic

You are required to pick a specific area of research in advanced computer networks to investigate in your survey paper. The topics to choose from are:

* + Next Generation Wireless Network
  + Wireless Sensor Networks
  + 5G and onwards to 6G
  + Information-Centric Networking
  + Named Data Networks (NDN)
  + Networking Support for AR/VR/Metaverse-based applications
  + Vehicular networks (aka VANETs, Connected and Autonomous Vehicles - CAVs)
  + Unmanned Aerial Vehicles (UAVs, aka Drones)
  + Communications and Applications for CAVs on Land, Water, and Sky
  + Internet of Things (IoT)
  + Industrial Internet of Things (IIoT)
  + Software Defined Networks (SDN)
  + Network Functions Virtualization (NFV)
  + Edge Computing
  + Network Softwarisation and Virtualization
  + Green communication systems and networking
  + Artificial Intelligence (AI) enabled/enhanced wireless communications.
  + Mobile nano-networking
  + Satellite and Space Communications
  + Quantum networks and communication
  + Internet of Skills
  + Tactile internet
  + Applications of the above technologies in Smart Cities (e.g., e-healthcare, smart transportation, and smart grid)
  + Security and privacy issues in any of the above communication technologies

If you wish, you may choose another emerging topic in advanced computer networks, but you **must**

get approval from Muhammad **Atif** Ur Rehman first.

When selecting a topic, you will need to consider its *scope* carefully. Choosing **too narrow** a scope will make it difficult to find a sufficient range of quality and recent papers on the topic while choosing **too wide** a scope will make it difficult to provide adequate coverage of the related research within the space limit given. You might find, during your research, that you need to broaden or narrow the topic that you have chosen – you should discuss this with Muhammad **Atif** Ur Rehman if needed.

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# Your Paper

Your paper should provide a survey of state-of-the-art research on the topic of your choice. Your work should be appropriately referenced, using [the IEEE referencing style](https://ieeeauthorcenter.ieee.org/wp-content/uploads/IEEE-Reference-Guide.pdf)[.](https://www.acm.org/publications/authors/reference-formatting) Feedback and answers to potential questions will be provided at the end of the weekly lab sessions on the development and structure of your paper, and a draft should be prepared for formative feedback during the coursework support sessions.

Your paper must be **4-5 pages** long (**no less than 4 and no longer than 5**) in [**IEEE double-column format**](https://www.ieee.org/conferences/publishing/templates.html), including any figures/tables, and bibliography. This type of instruction is typical for the submission of research papers to academic and professional workshops and conferences, rather than a word limit specification.

Your survey should cover research published in the last **five** years, preferably in the last **three** years. Older publications are generally only accepted in sections other than the survey body. You are expected to cover **four technical papers** in the survey body. Detailed guidance on critically reading a technical paper will be provided in the first three lab sessions under the **“Research & Learning Focused”** module.

# Submission instructions

The deadline for submission of your survey paper is Friday, **12 Jan 2024, at 21:00**. You must submit your paper (in **PDF format only**) via the appropriate links on Moodle. The deadline is a hard deadline unless you have applied for a self-certified extension or if you have an **exceptional factors** application approved.

All students must upload both video and PowerPoint slides **individually (even if you are working in a group)** on Moodle. Failure to do so will result in 0 marks.

# References

IEEE Manuscript Templates for Conference Proceedings. [Online][Accessed 22 September 2023] <https://www.ieee.org/conferences/publishing/templates.html>

1. **Marking**

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| **Mark** | **86 – 100 (Outstanding)** | **70 – 85 (Excellent)** | **60 – 69 (Good)** | **50 -59 (Acceptable)** | **1-49 (Poor)** |
| **Abstract (10%)** | Concise, clearly outlines aim of study, methodology, findings, and conclusions | Strong writing in relation to motivations/ideas, approaches, and results of the report | Summary of the report in relation to motivations and ideas, approaches, and results of the report in all aspects | Summary of most aspects, such as motivations/ideas, approaches, and the results of the report | Incomplete description/summary regarding motivation/ideas, approach, and results of the paper  Missing abstract. |
| **Introduction (15%)** | Introduces topic  Clear, logical progression from literature review to aims of study  Choice of methodology introduced and supported  Aims and hypotheses well formulated | Clear presentation of the topic.  Methodology of survey discussed.  Aims and hypotheses at least touched upon. | Topic introduced but not fully explained.  Methodology of survey discussed.  Limited reference to aims, objectives or outcome of the survey. | Survey topic introduced but unclear to reader.  Methodology presented with limited clarity.  Very limited or no reference to aims, objectives or outcome of the survey. | Some attempt to introduce the topic of the survey.  Little or no description of the survey methodology.  Failure to adequately introduce the surveyed topic. |
| **Survey Body (30%)** | All materials are relevant to the objectives of the study.  Shows in-depth understanding of the techniques, methodology, and mechanisms described in the reading materials  Provide synthesis and critical analysis of previous research and its relation to the current study  Excellent coverage of the surveyed topic and evaluation tools. | Materials are relevant to the objectives of the study.  Shows sufficient understanding of the techniques/ methodology/ mechanisms described in the reading materials  Provide sufficient synthesis and critical analysis of previous research and its relation to the current study  Very good coverage of the surveyed topic and evaluation tools. | Majority of materials are relevant to the objectives of the study.  Shows some understanding of the techniques/ methodology/ mechanisms described in the reading materials  Provide some synthesis and critical analysis of previous research and its relation to the current study  Reasonable coverage  of the surveyed topic and evaluation tools | Some materials are relevant to the objectives of the study.  Shows some understanding of the techniques/ methodology/ mechanisms described in the reading materials  An attempt at critical analysis and synthesis of the surveyed papers.  Weak coverage of the survey topic and evaluation tools | Few materials are relevant to the objectives of the study.  Shows limited understanding of the techniques/ methodology/ mechanisms described in the reading materials  Provides limited synthesis and critical analysis of previous research and its relation to the current study |
| **Conclusion (10%)** | Clear presentation of fully justified findings.  Logical conclusions based on research evidence.  Critical competence. | Logical conclusions  Predominantly based on evidence.  Evidence of ability to critically evaluate.  Results linked consistently to objectives | Clear presentation of conclusions related to evidence.  Results linked to objectives of the study. | Draws together some of the ideas from the survey.  Results mostly linked to objectives of the study. | Weak conclusions.  Little or no conclusions drawn. |
| **Macro-Structure (15%)** | Clear and informative title  Very effective organisation using the format specified.  Divided into appropriate sections (Intro, Method, etc.)  Headings and subheadings informative  References are complete and correctly cited in the text and bibliography  Very effective use of language with accuracy in syntax, grammar, and mechanics, making explanations clear and coherent.  Very wide variety of appropriate word choices. | Clear title  Effective organisation using the format specified.  Divided into appropriate sections and subsections  Headings and subheadings appropriate  References complete and correctly cited in text and bibliography with few omissions  Effective use of language with mostly accurate syntax, grammar, and mechanics, making explanation clear and coherent.  Wide variety of appropriate word choice. | A clear title  Well organised using the format specified.  Good use of sections and subsections with appropriate naming.  Good referencing.  Good use of language with accuracy in syntax, grammar, and mechanics, making explanation clear and coherent.  Some variety of appropriate word choice. | Acceptable title.  Organisation approaches the expected format.  Limited use of headings and subheadings, or sections and subsections poorly labelled.  Good referencing, perhaps with minor errors.  Acceptable use of language: writing is readable and coherent, with perhaps minor errors. | Title does not capture the topic being surveyed.  Poor organisation, ignoring expected format.  Headings/subheadings poorly chosen or missing.  Missing sections. Missing references,  deviations from the specified referencing style, errors in referencing.  Poor use of language with limited accuracy in syntax, grammar and mechanics, making some parts of explanation incomprehensible and incoherent.  Limited word choice. |
| **Self-Reflections (20%)** | An annotated copy with supporting comments and a link with evidence. | A copy of the marking grid with a bullet point for each annotation, easy to read and organised.  Evidence of an honest self-reflection. | A copy of the marking grid with some supporting comments but unorganised explaining how they have met that grade boundary. | Annotated copy of the marking grid without any supporting comments. | No annotated copy of the marking grid |