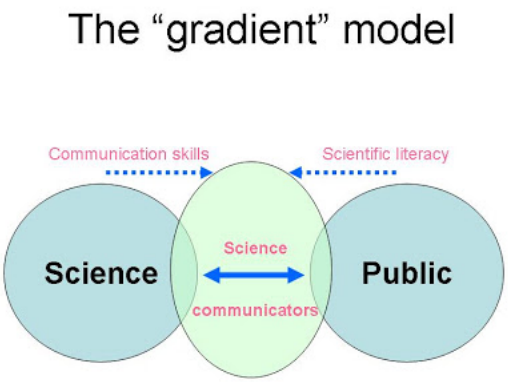
COURSE TITLE: SCIENTIFIC COMMUNICATION COURSE

I. COURSE LEVEL



- **Welcome Message:**
  - Welcome to this exciting course related to scientific publication. This course aims at providing research skills in developing a scientific research paper and at a later stage a policy brief. At the end of the course, you will be able to improve your skills in writing an abstract and main components of a scientific research paper. You will be able to review a research paper and describe different components and flow of each section of a scientific paper. At later stage, you will be introduced to how to develop a policy brief from your research findings for an evidence-based policy decision.

- **Course Overall Learning Outcomes:**

  At the end of this course, you will be able to:

  - Apply principle of research question development and the development of major sections of a scientific paper.
  - Debate the importance of publication and key steps to get started
  - Describe methods strategies, results, discussions and submission processes
  - Apply acquired skills to point out pitfalls of a policy brief
  - Prepare a draft manuscript for submission

- **Module Developers**
  - Course leader: Condo Jeanine, MD, PhD
    - jcondo@nursph.org
  - Course members: Humuza James, MD, PhD
    - jhumuza@nursph.org
  - Course Online Instructor: Ngenzi Joseph, MSc (cand.)

- J.ngenzi@ur.ac.rw

- **General Module Resources:**
  - Class notes, power point presentations, short videos, webpage links and scientific papers will be used to support learning outcomes across 6 sessions of the scientific commission course.

- E-tivity 0.1: Introduce yourself
  - You should introduce yourself, focusing on your professional background
  - Each one of you should state the expected outcomes at the end of this course
  - Kindly, be aware that there is no silly question and there is no silly answer.
  - You are all here to learn from each other and to exchange new principles, knowledge and skills with your instructors.

II. Session 1: Getting Started

- Aim of session I: This session will introduce you to the importance of publication and overall skeleton of a research manuscript. A good and attracting title and introduction section will influence the reader to read or NOT your entire manuscript. The editor of the journal will decide whether or not your manuscript will undergo to further review or subject for rejection.
- Content of session 1: Getting Started
  - Why publishing
  - Structure of manuscript
  - Title Page
  - Abstract structure
  - Authorship
  - Getting started and Introduction section of the manuscript
- Unit Learning Outcomes:
  - At the end of the session, you will be able to:
    - understand the importance of publishing and different structures of abstracts, requirements of authorship,
    - Write a good title page and attracting introduction section of the manuscript.

- **What students are expected to do (Tasks):**
    - Purpose: To learn how to develop a good title and the introduction section which are the foundation of the manuscript, you are invited to do the following:
    - Preparatory research:
        - Download presentations of session 1 of scientific communication course: this will strengthen knowledge of identification of good and bad title, understand TOPIC requirement
        - Watch video on introduction section of manuscript and describe the 6 components of an introduction section
        - Read references below:

Learning resources:

- Power point presentations, notes introducing the section, book and weblink to articles
- Lundberg GD. How to write a medical paper and get it published in a good journal. Medscape General Medicine 2005;7:36
- http://improbable.com/airchives/paperair/volume2/v2i5/howto.htm (How To Write A Scientific Paper)
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3626472/: How to write a scientific manuscript for publication

- **E**-tivity 1.1: Summarize in each of the papers for reading in one paragraph each. What is the main idea? Why is it important to publish?
- **E**-tivity 1. 2: You are given examples of title for your activity (session 1- slides 16). Choose among the 5 titles suggested, which one is a good title, and which one is a bad title using TOPIC criteria. Upload your summary to your assigned group (1-5). Every member should comment on the reasons of the choice. Lastly, each group should present the final group choice to the plenary for the selected 5 topics.
- **E**-tivity 1.3: You are given an introduction section under course materials- session1. Based on the 6 components of an introduction section, identify these components in the example of the introduction. Submit your observation to your group assigned to you and comment to your peer observation and respond to their feedbacks addressed to you to your post.

III. Session 2: Methods

- Aim of session 2: This session will introduce you to the main components of method section, the appropriate tenses and appropriate flow of the session. You will also be introduced to the common method section pitfalls. This section is important as most of the designated reviewers of your manuscript will decide whether or not your manuscript will undergo to further review or subject for rejection. This section should be clear enough to allow replication of findings, proper interpretation of results and most importantly allow assessment of the quality of the study and validity of your conclusions.
- Content of session 2: Method
    - Study design
    - Study population and sample size
    - Sample collection and processing
    - Data storage and analysis
    - Ethical review
- Unit Learning Outcomes:
    - At the end of the session, you will be able to:
        - Describe main components of the method section
        - Assess the clarity and flow of the method section by applying CONSORT and STROBE
        - Use appropriate tenses as required by journals

- **What students are expected to do (Tasks):**
    - Purpose: To understand key components of the method section and its appropriate flow.
    - Preparatory research/ over to you:
        - Use presentations of session 2 of scientific communication course: this will introduce you to the main and critical components of the method section and how each section relates to the previous one and prepare the next sub-headings.

- Watch the recorded video on method section related to common pitfalls, tenses and use of CONSORT and STROBE

Learning resources:

- Power point presentations, notes introducing the section, book and weblink to articles
- http://www.consort-statement.org/checklists/view/32--consort-2010/96-statistical-methods
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4520133/: Consort: When and how to use it
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6398292/: The STROBE guidelines

- **E**-tivity 2.1: You are requested to develop your method section for your activity. Your work will be assessed by your peer and you will assess your peer's method section. The following are tasks you need to report on (max 1-2 page): (1) are all key components of the method section developed and appropriate? (2) did your classmate author (s) apply appropriate study design? (3) assess the flow and tenses as described during the course, (4) was there any issue with quality assurance and bias control?, (5) assess appropriateness of statistical analysis. Every member should comment on the reasons of his/her choice. Lastly, each of you should present the final activity to the plenary using maximum 3 power point slides.
- **E**-tivity 2.2: You are given an article and focus on the method section. You are assigned in the group (refer to the class 1) and based on the key components of the method section, identify these components in the method section. Use CONSORT and STROBE and assess the (1) appropriateness of study design, (2) the Adequacy of the quality assurance and bias control and (3) strength of the statistical analysis method use. Submit your observation to your group assigned to you and comment to your peer observation and respond to their feedbacks addressed to you to your post. You will then choose one group member to represent your group during the plenary session.

IV. Session 3: Results

- Aim of session 3: This session will introduce you to how to present result findings coherently – that is supported by the method section. You will learn the importance of referring to research questions and objectives to

present key findings that are objective including negative results. The importance of presenting this section chronologically using appropriate format: tables, figures or graphs or just presented in form of text.

- Content of session 3: Result
    - Development of the analysis plan and its application in the result section
    - Chronology present the result section
    - Appropriateness of the presentation of the research findings
- Unit Learning Outcomes:
    - At the end of the session, you will be able to:
        - Develop and apply the analysis plan to report on research findings
        - Understand how chronologically research findings are presented
        - Choose appropriate presentation format of the results; (1) text, (2) tables or (3) graphs

- **What students are expected to do (Tasks):**
    - Purpose: To develop the analysis plan and its application in the result section.
    - Preparatory research/ over to you:
        - Read articles on how to develop analysis plan and how it is applied to research findings section.
        - Read power point presentations on the development of analysis plan

Learning resources:

- Power point presentations, notes introducing the section, book and weblink to articles
- http://www.ats.ucla.edu/stat/spss/whatstat/whatstat.htm#1sampt
- Watch the video below: https://youtu.be/gm9t6WYBSuI
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4552232/: Creating a data analysis plan: what to consider when choosing statistics for a study
- http://www.princeton.edu/~otorres/Stata/: Data and statistical services
- http://www.columbia.edu/cu/biology/ug/research/paper.html
- Non-compulsory reading but necessary to report on health data indicators:

- https://www.who.int/healthinfo/DQRC_Indicators.pdf

- **E**-tivity 3.1: You are requested to develop your analysis plan for this activity and choose which findings will be presented in form of text, table or graph. For each of the result subheading- you will describe all requirements of the presentation chosen (table, figure or text). At the end of the E-tivity 3, your analysis plan with bank tables will be shared to the instructor for grading.

V. Session 4: Discussion

- Aim of session 4: This session will introduce you to the main components of the discussion section and its appropriate flow. This section ends the Introduction Method Result And Discussion (IMRD) structure of a scientific peer reviewed article. This section guides the student how to write the discussion effectively, while avoiding plagiarism and self-plagiarism. The discussion section points the reader toward what is needed for future researchs.
- Content of session 4: Discussion
  - Summarize the context
  - Answer your research question(s)
  - Interpret your results in context of existing knowledge
  - Explain any methodological problems (e.g., bias)
  - Discuss implications of research findings
  - Provide suggestions for additional research
- Unit Learning Outcomes:
  - At the end of the session, you will be able to:
    - Describe main components of the discussion section
    - Assess discussion section components
    - Develop the main key components of IMRAD

Learning resources:

- Power point presentations, notes introducing the section, book and weblink to articles
- https://www.research4life.org/training/athor-skills/

- **What students are expected to do (Tasks):**

- Purpose: To understand key components of the discussion section and its appropriate flow.
- Preparatory research/ over to you:
    - Use presentations of session 4 of scientific communication course: this will introduce you to the main and critical components of the discussion section.
    - Watch the recorded video on the discussion section related to the 6 components of a scientific research paper. You will be introduced to the notion of plagiarism and self-plagiarism and other common mistakes to avoid while writing the discussion section.

- **E**-tivity 4.1: You are given an article and focus on the discussion section. You are assigned in the group (refer to the class 1) and based on the key components of the discussion section, identify these components in the discussion section of the article and assess the following: (1) how the author summarized the research context (2) did the author address the key research question (s) ? (3) were the results interpreted in the context of the existing knowledge? (4) was the interpretation objective or subjective? (5) do you see any methodological problems or bias that was (were) not addressed? If yes, which one (s)? (6) are there any stated implication from research findings? (7) what are suggestions for future research or implication of policy? Submit your observation in 1-2 pages to the designated platform (deadline depends on course schedule)

VI. Session 5: Reference and final bits

- Aim of session 5: This session will introduce you to the reference while using Mendeley but also to the main submission process summarized here as final bits. This session will cover the entire editorial process including the DO's and DON'Ts from the abstract to the reference including the submission process.
- Content of session 5: reference and final bits
    - Structure of an abstract
    - Describe IMRAD structure including flow, tenses, chronology
    - Preferred references and avoidance of grey literature

- Use of Journal's guideline to author (normally posted on the journal's website)
- Components of a cover letter
- Submission processes
- Editorial review and peer review considerations

- Unit Learning Outcomes:
  - At the end of the session, you will be able to:
    - Describe main components of a full scientific research article
    - Develop draft manuscript
    - Use appropriate references
    - Undergo to submission process

Learning resources:

- Power point presentations, notes introducing the section, book and weblink to articles
- https://pubmed.ncbi.nlm.nih.gov/10538262/:Preparing manuscripts for submission to medical journals: the paper trail
- Peter Mason, Pamela Wright, Luu Ngoc Hoat. Writing a scientific paper: A Scientific Article. A HANDBOOK. 2005. PP 63-68

- **What students are expected to do (Tasks):**
  - Purpose: To develop key components of the scientific research paper
  - Preparatory research/ over to you:
    - Use the database provided to you to:
      - Develop research question (maximum 2 research questions)
      - Develop method section while applying principles as described in session 2 (1-2 pages)
      - Develop result section and choose appropriate presentation of the result section (3-4 pages)
      - Develop the introduction and discussion sections of 2-4 pages each

- Apply Mendeley for reference

- **E**-tivity 5.1: You are requested to develop your paper (12-15 pages) single spaced. References should not be more than 15 articles recently published (5 years or below) and are not included in the 12-15 pages. Within your group, assign each of you one section of IMRAD to be developed. Your work will be assessed by your peer (graded) and you will assess your peer's section developed. Referred to "over to you" to develop your group draft paper as described above. Finally choose 3-5 preferred journals where your work will be published.

VII. Session 6: Policy Brief

- Aim of session 6: This session will introduce you to the importance of policy brief. In many cases, researchers develop their research paper targeting academic audience. However, the consumer of your research findings are mainly policy makers. In addition, most academicians fail to link research findings to actionable policy briefs to help policy makers apply evidence base policy for impactful interventions.
- Content of session 6: Policy Brief
  - Planning for a policy brief development
  - Structure of a policy brief
  - Designing a policy brief
- Unit Learning Outcomes:
  - At the end of the session, you will be able to:
    - Understand main components of a policy brief planning
    - Describe major headings of a policy brief
    - Understand the design of a policy brief

- **What students are expected to do (Tasks):**
  - Purpose: To understand major headings and content of a policy brief
  - Preparatory research/ over to you:
    - Use presentations of session 6 of scientific communication course: this will introduce you the planning and the development of a policy brief

- **E**-tivity 6.1: You are requested to critically provide pros / cons on the policy brief provided to you (E-tivity 6: annex1). You are assigned to either pro or cons group to defend or criticize the policy brief as attached in E-tivity 6. Tasks: (1) read carefully the

policy brief provided to you, (2) Refer to slides 5-10 Annex of the session 6 to support the basis or argument. Present your idea on one page and paste your work in the designated area within your group work. Your work will be assessed by your peer and you will assess your peer's policy brief section.

Section VII: Concluding the course

I am convinced now you have become an expert in developing your own scientific research paper with a policy brief. Each E-tivity will be graded and the summative grade will be brought to 60% of all grades while the final assignment on the development of scientific paper will be graded out of 40% of overall mark- making a total of 100%. Remember, this course introduces to a new but exciting adventure to enjoy academic merit as you start and keep publishing. The more you publish, the more academic/ scientific journals will seek your time-knowledge and skills to provide reviews on other researcher's scientific papers.