ANNUAL REPORT

FY-2079/2080

CENTRAL DEPARTMENT OF MATHEMATICS

Tribhuvan University

Institute of Science and Technology

Central Department of Mathematics

Executive Summary

The annual report of the Central Department of Mathematics (CDM) summarizes the various activities undertaken by the department during the fiscal year 2078/079. This report is based on a database that includes information on student enrollment, graduation rates, and dropout rates over the past three academic years, income sources, expenditure trends, existing facilities and infrastructure, and the availability of computer rooms at the department.

The student enrollment in the Mathematics program has in declining trend which is serious concern for us. Central Department of Mathematics together with Nepal Mathematical Society is continuously organizing various activities for mathematics faculty and students so as to increase the enrollment number. The dropout rate among students has been increasing, as only a few students have chosen to pursue higher education abroad. The graduation rate among enrolled students has been consistently high and satisfactory. A majority of the graduates have gone on to pursue careers in teaching and research at affiliated universities and colleges, while some have joined the civil service sector or opted for self-employment.

As a public academic institution, CDM recognizes its social responsibility and maintains regular communication with government organizations, local authorities, research institutions, and communities. The report includes the department's work plan, budget for the current and upcoming fiscal years, and other relevant data in the annex.

1. Background

The Central Department of Mathematics, established in 1959, is a vital part of Tribhuvan University, offering comprehensive programs in pure and applied mathematics. With a focus on diverse areas such as algebra, topology, numerical analysis, and more, our department prepares students for lifelong learning and success in various fields. Our highly qualified faculty, including PhD and Post-Doc holders, bring teaching experience and research backgrounds from prestigious institutions worldwide. We actively collaborate with national and international partners, organizing conferences, workshops, and seminars to advance mathematical research. Through our efforts, we aim to produce high-quality professionals capable of addressing industry and societal challenges, while also promoting research dissemination through our biannual journal.

This annual report presents an analysis and summary of the department's activities and progress during the fiscal year 2078/2079. It provides information on the department's human and physical resources, academic advancements, program enrollment trends, pass rates, graduation trends, and educational pedagogy. The trend analysis of the past three years (enrollment batches in 2076/077, 2077/078, and 2078/079) indicates that the pass rate for MSc students at the Central Department of Mathematics consistently each year. It was observed that the pass rate was higher for female students in most examinations, as the number of admitted female students has consistently been higher in all academic years (refer to Table 1). In the fiscal year 2078/79, a total of 12 students successfully defended their thesis works (see Annex-IV).

2. Academic Progress

2.1. Pass Rate/Graduation Trend of Students during Last Three Years

The trend analysis of three year (Batches enrolled in 2076/077, 2077/078 and 2078/079) clearly revealed that the pass rate of M.Sc. students at the Central Department of Mathematics was greater than eighty four percent every year. Pass rate was found to be higher in female in most of the examinations as the number of admitted female students is always higher in all the academic years (Table 1). A total of 27 students successfully defended their thesis works in the FY, 2078/79 (Annex- IV).

Table 1: Pass Rate/Graduation Trend of M.Sc. Students in last Three Academic Years by Gender

Year	Semester	Total students appeared in exam			Passed Students (%)		
		Male	Female	Total	Male	female	Total
2076/077		53	6	63	45 (84.9%)	0 (100%)	45
2077/078		31	3	34	Running	Running	Running
2078/079		46	5	51	Running	Running	Running

2.2. Educational Pedagogy

The curriculum of M.Sc. Mathematics comprises theory, practical (experiments), seminars and homework sets. The pedagogy adopted at the CDM includes lecture method with ppt, demonstration and models, group work and discussion, presentations, preparing reports on assignments, e-learning, etc. in theory and computational work.

The faculties deliver lecture through interactive methods (using smart boards, Multimedia projector, overhead projector, white board, maps and chart display, etc.). Sometimes students are divided into groups to study in different topics and share their ideas, later the groups have to prepare presentation. Self-learning and guided assignments enable the students to explore and synthesize information through books and journals. E-Library, online classes, presentation, guest lecturers, webinars and have been extensively used.

2.3 Scholarship, Freeships and Research Grant

The students from CDM have been awarded various scholarships to support their studies and research leading to their M.Sc. thesis. These scholarships and research grants primarily come from the University Grants Commission (UGC). Each semester, two students (one female and one male) are awarded scholarships based on merit, and 15% of the students receive freeships. The selection of freeship recipients is based on an inclusive basis, considering factors such as gender (women), ethnic background (Janajati), regional representation (Madhesi), and disadvantaged groups. The

selection process takes into account the marks obtained in the previous semester exam. Furthermore, numerous M.Sc. scholars, along with a few Ph.D. scholars, have received research grants for their studies from UGC Nepal, NAST (Nepal Academy of Science and Technology), and the National Youth Council. Besides this, entrance topper students (one boy and one girl) have been awarding by NMS-ANMA fellowship every year. NMS fellowship has been awarded to semester topper students both from boys and girls.

2.4 Academic visits, Seminars, Guest Lecturers and Webinars

To familiarize students and research scholars with the latest developments in various subjects, the department organizes visiting/guest lectures, talk programs, and webinars featuring distinguished national and international scientists from various fields. These experts deliver scientific lectures to familiarize our students with recent advancements in mathematical sciences. These initiatives have not only sparked interest among our students in their chosen research fields but have also exposed them to the experiences of international mathematicians. All academic discussions held through expert visits, seminars, guest lectures, and webinars by experts from national and international universities have been included in this report as an annex (Annex-V).

2.5. Publications

The Central Department of Mathematics is responsible for publishing the Nepalese Journal of Mathematics (ISSN: 2392-411X). The journal follows a peer-reviewed, double-blind, multidisciplinary, and open access format. It is an international journal that is published biannually and focuses on research findings in the fields of Mathematics and its applications.The Nepali Math. Sc. Report is hosted on the Nepal Journal online (NepJOL) Platform. In the fiscal year 2078/079, the journal adopted the Journal Publishing Practices and Standards (JPPS) framework. Apart from the department's own publication, faculty members also contribute to the dissemination of their research by publishing articles in various national and international journals (Annex-VI).

3. Physical Progress

3.1. Infrastructural Development

In the academic year 2078/079, CDM did not invested for major infrastructure development, however, maintenance of computer lab, equipment's, educational aids (online) and strengthening e-library have been undertaken.

3.2. Educational Aids

Meeting hall, lecture halls and practical rooms of the department are equipped with some basic educational aids such as Multimedia Projector, smart board and white board. Each class room, Library and computer lab are provided with internet facilities.

3.2.1 Educational Equipment (ICT, Lab Equipment)

CDM is having and ICT lab provided with number of computers for the students and all the faculties with internet facility. CDM has basic instruments to conduct experiments and field works. Numbers of apparatus and other high-tech instruments are not adequate for current number of students and most of them are old and needs to replace by new models. Recently, CDM has established a computer laboratory.

3.2.3 Furniture

Faculty rooms, staff rooms, lecture halls, meeting rooms, laboratories and library are well furnished.

4. Financial Progress

4.1 Financial Resources/Income of the Last Three Years

4.1.1 Self-Generated Resources/Income

The income of the department included self-generated income and Government grants through the UGC. Self-generated financial resources comprise of the fees collected from M.Sc., M.Phil. and PhD students and research grants.However, the students have to bear themselves the expenses incurred in the field work.

Table 4. Income of CDM for three fiscal years (2047/075-2076/077)

4.1.2 Grants form Government Sources

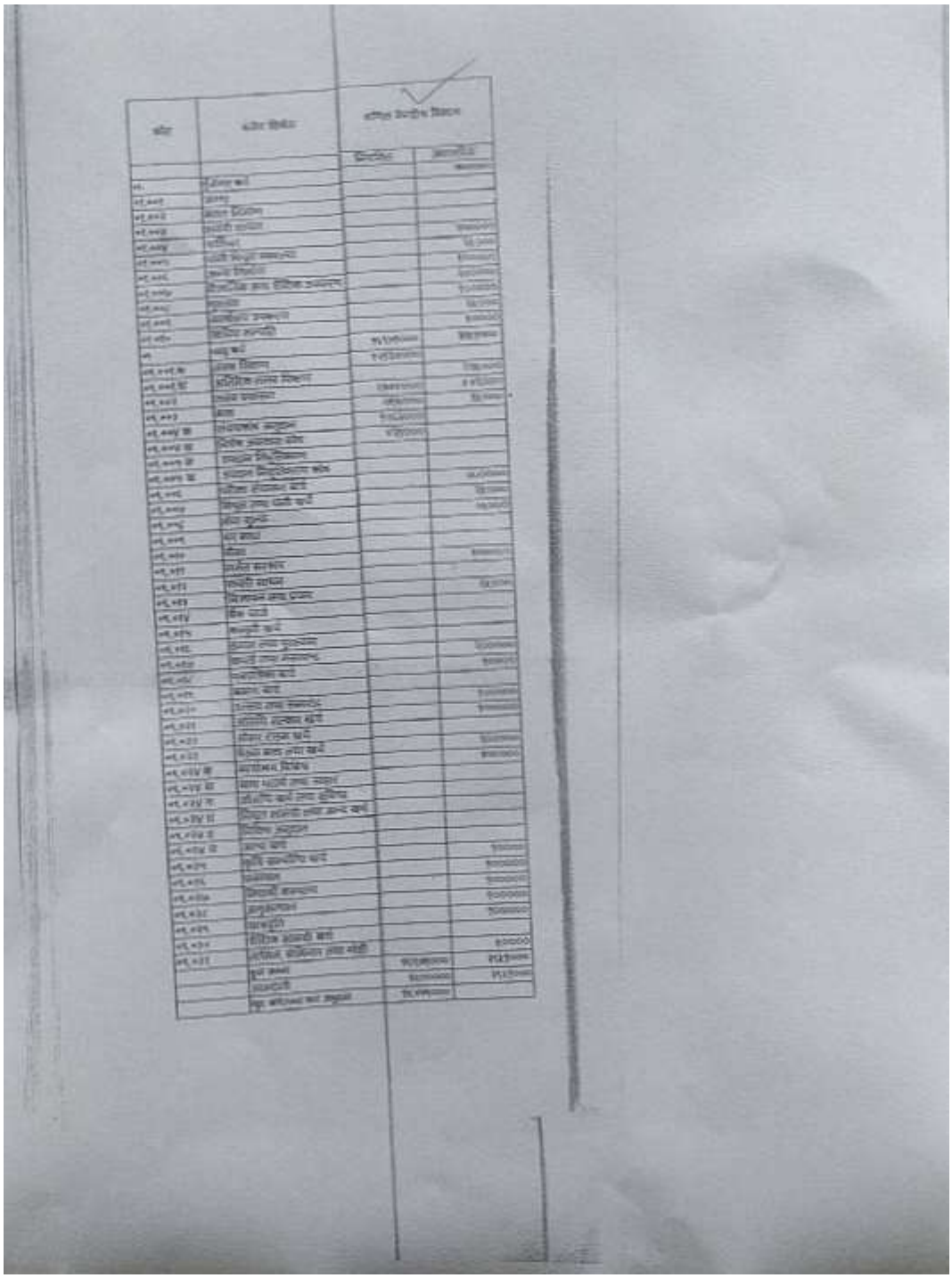
Department receives fund from the Government through the University Grants Commission, Nepal. The following is research UGC grant:

1	Small RDI	Dr. Bishnu Hari Subedi	UGC Research Grant	1,50,000/-
2	Small RDI	Dr. Shree Ram Khadka	UGC Research Grant	1,50,000/-
3	Faculty Research	Dr. Jeevan Kafle	UGC Research Grant	3,00,000/-
Total				6,00,000/-

4.2 Expenditures Analysis of the Last Three Years

The expenditure analysis reveals that the department's major expense is salary. The recurrent expenses have shown a gradual increase, ranging between 18.63 and 20.92 million rupees. In contrast, the capital expenditure is considerably low. Furthermore, no investments were made for infrastructural development.

Table 4: Expenditures of CDM for three fiscal years (2076/077-2078/079)



4.3 Audit Observation/Issues and Steps Taken to Mitigate the Raised by Audit Observation in the Last Fiscal Year

The department adheres to all the rules, regulations, and guidelines set forth by the Government and University. The account system of the CDM undergoes regular internal and external auditing processes and evaluations. Any discrepancies or issues identified by the auditor are rectified with the necessary clarification and supporting documents**.**

5. Social Progress

5.1 Department's Involvements in Social Activities

The CDM and students are regularly involved in events celebration like PI day, Math day. In celebrations, awareness program for high school students were organized. Such events are very fruitful to these students.

5.2 Plans for Central Department's Contribution to the Society

The CDM has a strategic plan to collaborate closely with various levels of government, non-governmental organizations, civil society, and the general public. The department has actively been fostering and enhancing relationships with internal and external partners as well as donors. The CDM aims to establish a robust and mutually beneficial relationship with the public and policy makers. This is done to shape the research and education initiatives of the department and to promote the broadest possible utilization of research findings and expertise in the policymaking process.

5.3 Plans for Effective Involvement of Society with the Central Department of Mathematics

By prioritizing public engagement and knowledge exchange, the department aims to ensure that our research and education efforts have a positive impact on the public throughout the country. To achieve this objective, we will collaborate with public, private, voluntary, and commercial organizations, as well as our alumni.

Our key goals are as follows:

1. Build stronger and constructive relationships with communities.
2. Engage with the public and policy makers to shape our research and education initiatives, and encourage the broadest possible utilization of our research findings and expertise.
3. Continuously enhance public engagement through events and programs delivered through various mechanisms.
4. Expand strategic international research collaborations.
5. Inform, empower, and mobilize alumni to actively participate in mathematical research, thereby supporting the University's objectives.
6. Engage with businesses and other stakeholders to increase the volume and value of non-public-sector-funded research in a sustainable manner.
7. Foster collaboration among staff, students, and alumni to provide high-quality research and education that benefits society at both local and national levels.

By focusing on these areas, we aim to ensure that our work has a meaningful and positive impact on society.

5.5 Issues and Challenges

The Central Department of Mathematics has encountered several short-term and long-term issues and challenges that have had a direct or indirect impact on the academic progress of the department and the success of its graduates.

5.5.1 Short Term Challenges

- Limited facilities and inadequate text/reference materials to meet the needs of students. Furthermore, there is a lack of current and up-to-date materials.
- Insufficient computers to accommodate the current number of students.
- Inadequate information technology facilities and information management systems.
- Overstretched facilities due to the large number of students.
- Weaker connections with both the government and private sectors.
- Lack of sufficient space for academic and administrative set up.

5.5.2 The Long Term Challenges

The Central Department of Mathematics is facing several critical issues and challenges that are directly impacting its academic activities and the overall learning environment. These challenges include:

- Insufficient number and diversity of faculty members. The lengthy recruitment process for qualified faculty hampers regular teaching and research activities within the department.
- Inadequate basic infrastructure, including lecture rooms, and computer rooms, cafeteria, and library, which directly affect the smooth functioning of academic activities.
- Outdated technology: The department needs to update or introduce modern technology to meet international standards and enhance the quality of education.
- Lack of funding, which negatively impacts regular research activities and ultimately undermines the quality of teaching and the learning environment.
- Decreasing students enrollment trend

Addressing these challenges is crucial to improve the department's overall performance and ensure a conducive and progressive academic atmosphere. Adequate resources, enhanced infrastructure, diverse faculty, modern technology, and sufficient funding are essential elements for the department to provide high-quality education and research opportunities to its students.

5.5.3 Mitigation Measures Taken to address the issues and meet the challenges

The department requires support from Tribhuvan University and the Government to address the issues and challenges it faces. The department and faculty members are making significant efforts to mitigate these challenges.

5.5.4 Plan for Addressing the Issues and Challenges

The department maintains regular communication with the relevant authorities to address the challenges and issues it faces. Additionally, the department has plans to establish partnerships and collaborations to enhance its academic and research activities. These include:

- Seeking research grants from the University Grants Commission (UGC) and other institutions to update computer laboratory facilities and other resources.
- Formulating strategies for collaborative research with Nepalese and foreign universities through Memorandums of Understanding (MoUs).

By actively seeking support and fostering collaborations, the department aims to improve its research capabilities and create opportunities for academic advancement.

6. Annual program and Budget of the Current Fiscal Year, 2078/079

गणित केन्द्रीयविभाग

Table 6: आ.व. २०७६/०७७को कार्यक्रम र बजेट (त्रि.वि. सभाबाट पारित)

Annex I. Name of Current Faculty Members of Central Department of Mathematics, TU

S.N	Name	Designation	Education	Stream
1	Prof. Dr. Tanka Nath Dhamala	Head and Professor	PhD	
2	Prof. Dr. Chet Raj Bhatta	Professor	PhD	
3	Prof. Dr. Ajaya Singh	Professor	PhD	
4	Assoc. Prof. Tulasi Prasad Nepal	Associate Professor	Master	
5	Assoc. Prof. Shree Ram Khadka	Associate Professor	PhD	
6	Assoc. Prof. Durga Jang KC	Associate Professor	PhD	
7	Dr. Pawan Shrestha	Assistant Professor	PhD	
8	Dr. JhaviLalGhimire	Assistant Professor	PhD	
9	Dr. BishnuHariSubedi	Assistant Professor	PhD	
10	Dr. JeevanKafle	Assistant Professor	PhD	
11	Mr. Santosh Gyawali	Assistant Professor	Master	
12	Mr. Ganga Ram DC	Assistant Professor	Master	

Part time faculties

Annex I. Name of Current Faculty Members of Central Department of Mathematics, TU

S.N	Name	Position
1	Mr. Yuba Raj Gharie	Teaching Assistant
2	Dr. Ram Chandra Dhungana	Teaching Assistant

Annex-III: Name of PhD Scholar at the Central Department of Mathematics, TU

S.N	Name	Supervisor
1	Mrs. AnjanaPokahrel	Prof. Dr.KedarNathUprety
2	Mr. KhagendraAdhikari	Prof. Dr.KedarNathUprety
3	Mr. Ramesh Gautam	Prof. Dr.KedarNathUprety
4	Mr. Gyan Prasad Paudel	Prof. Dr. Narayan Prasad Pahari
5	Mr. Pitambar Tiwari	Prof. Dr. Chet Raj Bhatta
6	Mr. Jagat Krishna Pokhrel	Prof. Dr. Narayan Prasad Pahari

7	Mr. Durga Prasad Khanal	Prof. Dr. UrmilaPyakurel
8	Mr. Badri Prasad Pangeni	Prof. Tanka Nath Dhamala
9	Mr. Mohan Chandra Adhikari	Prof. Dr. UrmilaPyakurel
10	Mr. BekhaRatnaDangol	Dr. JeevanKafle
11	Mr. Chetnath Tiwari	Dr. Parameshwari Kattel
12	Mr. Tek Bahadur Budhathoki	Dr. Pushkar Raj Pokhrel
13	Mr. Chudaman iPokharel	Prof. Dr. Chet Raj Bhatta
14	Mr. Bishwa Adhikari	Prof. Tanka Nath Dhamala
15	Mr. Dipakbabu Amgain	Prof. Tanka Nath Dhamala
16	Mr. Sachin Wagle	Dr. UrmilaPyakurel
17	Mr. Pushpa Nidhi Gautam	Dr. JeevanKafle
18	Mr. Jaydev Nath	Prof. Chet Raj Bhatta
19	Mr. Bal Bahadur Tamang	Dr. Ajay Singh
20	Mr. Giri Raj Paneru	Dr. HariNandanNath
21	Mr. Parjwal Bir Sing Kansakar	Dr. BishnuHariSubedi
22	Mr. Ishwor Prasad Paudel	Dr. Shree Ram Khadka
23	Mr. Ananta Upreti	Dr. JhivandharGawaly
24	Mr. AnupTuladhar	Dr. JhivandharGawaly
25	Mr. Dal Bahadur Saud	Dr. BishnuHariSubedi

Annex-IV: List of M.Sc. Graduates from Central Department of Mathematics, TU during FY 2078/2079

S.N	Name	Title of research	Viva date
1	Kshitiz Mangal Bajracharya	A study of some sequential properties and fixed point theorems in b-metric space	2022 Aug
2	Bishnu prasad Gautam	A Study of Summability Methods through Matrix summation	2022 Sep
3	Biseswar Prasad Bhatt	The Banach -Stone Theorm And Its Applications	2022 April
4	Sudip Kumar Rayamajhi	Partition Of a Domain And Its Application To Approximation By Infinitely Differentiable Functions	2022 Nov.
5	khem Raj Dhakal	On The Computational Hardness Of Multi-Commodity flow Problem	2022 June
6	Sunil duwadi	A traffice flow Model :Impact of motorbikes in traffice congestion	2022 Dec

7	Rachan Chettre	Evolutionary multi -objective optimization for cancer chemotherapy	2022 June
8	Krishna prasad adhikari	Mathematical of the dispersion of air pollutants in the atmosphere	2022 Sep
9	Prakash Bayalkoti	Mathematical Study of temperature on tranesmission dynamics of dengue disease	2022 Sep
10	Ramuna pandey	Efffect of changing earth pressure coefficients in different directions	2022 Sep
11	Gaurab Chand	Optimization models with Exclusive Bus lanes	2022 June
12	Madhu Sudan Devkota	Laypunov's Stability theory With Its Application	2022 Agu.

Annex-V: Seminars, Online Guest Lectures and Webinars Conducted at Central Department of Mathematics, TU during FY 2078/2079

S.N	Date	Name/Address of the Expert	Lecture delivered on
1	October 17–19, 2022	Prof. Dr. Axel Kark	Numerical linear algebra, modelling, and simulation of evolution equations
2	Falgun 3, 2079	Prof. Dr. Bhadra Man Thuladhar	Research in Mathematics
2	Falgun 27-29, 2079	Prof. Kapil K Sharma, South Asian University	international workshop on computational Mathematics (IWCM-2023)
3	Baisak 17, 2080	Dr. Jeevan Chetri	

Annex-VI: Publication of Faculty Members of the Central Department of Mathematics, TU

2020-Publications

1. Pyakurel, U. &Dempe, S., Network flow with intermediate storage: models and algorithms, SN Operations Research Forum**,** 37 (2020). DOI: https://doi.org/10.1007/s43069-020-00033-0
2. Gupta, S.P., Khanal, D.P., Pyakurel, U. &Dhamala, T.N., Approximate algorithms for continuous-time quickest multi-commodity contraflow problem, The Nepali Mathematical Sciences Report, 37 (1&2), 30-46, 2020. https://doi.org/10.3126/nmsr.v37i1-2.34068
3. Pyakurel, U., Gupta, S.P., Khanal, D.P. &Dhamala, T.N., Efficient algorithms on multicommodity flow over time problems with partial lane reversals, International Journal of Mathematics and Mathematical Sciences, Volume 2020, Article ID 2676378, https://doi.org/10.1155/2020/2676378.
4. Dhamala, T.N., Gupta, S.P., Khanal, D.P. &Pyakurel, U., Quickest multi-commodity flow over time with partial lane reversals, Journal of Mathematics and Statistics, 16(1), 198-211, 2020, **DOI:** https://doi.org/10.3844/jmssp.2020.198.211.

5. Pyakurel, U., Wagle, S. &Adhikari, M.C., Efficient lane reversals for prioritized maximum flow, International Journal of Innovative Science Engineering and Technology (IJISET), 7(7) 354-363, 2020.
6. Adhikari, I.A., Pyakurel, U. &Dhamala, T.N., An integrated solution approach for time minimization evacuation planning problem. International Journal of Operations Research, 17(1) 27-39, 2020, DOI:10.6886/IJOR.202003_17(1).0002
7. Nath, H.N., Pyakurel, U., Dhamala, T.N. &Dempe, S., Dynamic network flow location models and algorithms for evacuation planning, AIMS Journals, Journal of Industrial and Management Optimization (JIMO) 2020, Doi: 10.3934/jimo.2020102
8. Adhikari, I.M. &Dhamala T.N., Minimum clearance time on prioritized integrated evacuation network, American Journal of Applied Mathematics, 8(4), 207-215, 2020, DOI: https://doi.org/10.3126/nmsr.v37i1-2.34063
9. Adhikari, I.M. &Dhamala, T.N., On the transit-based evacuation strategies in an integrated network topology, The Nepali Mathematical Sciences Report 37 (1&2),
10. Dhungana, R.C. &Dhamala, T.N., Flow improvement in evacuation planning with budget constrained switching costs, International Journal of Mathematics and Mathematical Sciences, vol. 2020, Article ID 1605806, 2020. https://doi.org/10.1155/2020/1605806.
11. Khanal, D.P., Pyakurel, U. &Dhamala, T.N., Prioritized multi-commodity flow model and algorithm, International Symposium on Analytic HierarchyProcess 2020, web conference at: *http://www.isahp.org/uploads/060_001.pdf*
12. Bhandari, A.D. &Dhamala, T.N., Quickest Flow Problem Using Improved Binary Search Algorithm,International Journal of Innovative Science Engineering and Technology (IJISET), 7(12), 2020.
13. Bhandari, P. P. &Khadka, S. R. (2020). Maximum Flow Evacuation Planning Problem with Non-Conservation Flow Constraint. International Annals of Science, 10(1), 25-32. DOI: https://doi.org/10.21467/ias.10.1.25-32
14. Bhandari, P. P. &Khadka, S. R. (2020). Evacuation Contraflow Problems with Not Necessarily Equal Transit Time on Anti-parallel Arcs. American Journal of Applied Mathematics, 8(4), 230-235. DOI:https://doi.org/10.11648/j.ajam.20200804.18
15. Bhandari, P. P. &Khadka, S. R. (2020). Evacuation Planning Problems with Intermediate Storage. In: Proceedings of International Conference on Applied Mathematics & Computational Sciences (ICAMCS-2019), AIJR Proceedings, 90-95. DOI: https://doi.org/10.21467/proceedings.100.9
16. Bhandari, P. P., Khadka, S. R., Ruzika, S. & Schaefer, L. E. (2020). Lexicographically Maximum Dynamic Flow with Vertex Capacities. Journal of Mathematics and Statistics, 16(1), 142-147. DOI: https://doi.org/10.3844/jmssp.2020.142.147
17. Khadka S.R. (2020). Improved Upper Bound to Product Rate Variation Problem. The Nepali Mathematical Sciences Report, Vol 37 (1, 2), 47-54/ DOI: https://doi.org/10.3126/nmsr.v36i1-2.29966
18. Luitel, K., Gurung, D.B., Khanal, H. &Uprety, K.N., Role of Clothing Insulation for Thermal Comfort: A Numerical Study using Bio-Heat Transfer Model, Journal of Mathematics and Statistics, Vol 16, 224-232, DOI: 10.3844/jmssp.2020.224.232.
19. Bajracharya, P. M. &Ojha, B. P. (2020). Birkhofforthogonality and different particular cases of carlsson'sorthogonality on normed linear spaces. Journal of Mathematics and Statistics, 16(1), 133-141. https://doi.org/10.3844/jmssp.2020.133.141
20. B. P. Ojha, P. M. Bajracharya, and V. N. Mishra (2020). On the uniqueness of new orthogonality via 2-HH norm in normed linear Journal of Function Spaces, vol. 2020, Article ID 8835492, 6 pages, 2020. https://doi.org/10.1155/2020/8835492
21. B. P. Ojha , P. M. Bajracharya (2020). A glimpse on Birkhoff-James orthogonality inBanach spaces, Methods Fnut. Anal. Topology, Vol. 26, no. 4, pp. 373-383.
22. B. P. Ojha, P.M. Bajracharya(2020). Robert orthogonality in normed linear spaces via 2-HH norm, IEEE-SEM, Volume 8, issue 1, pp. 85-93.
23. B. P. Ojha, P. M. Bajracharya (2020). Birkhoff and new orthogonality in normed linear spaces via 2-HH norm, International Journal of Scientific and Engineering Research, volume 11, Issue 2, pp. 225-232
24. Pokhrel P., Lamsal B., **Kafle J.***, Kattel P. (2020) Analysis of displacement of vibrating of mass-spring due to opposition force. *Tribhuvan University Journal*, **35**(1), 21-32.

Doi: https://doi.org/10.3126/jist.v25i2.33732**.**

25. Pokhrel P., **Kafle J.***, Kattel P., Gaire H. (2020) Analysis of Blood flow Through Artery with Mild Stenosis. *Journal of Institute of Science and Technology*, **25**(2), 33-38. https://doi.org/10.3126/jist.v25i2.33732**.**
26. **Kafle J.**, Bagale L., KC, D.* (2020). Numerical Solution of Parabolic Partial Differential Equation by Using Finite Difference Method. *Journal of Nepal Physical Society*, **6**(2), 57-65. https://doi.org/10.3126/jnphyssoc.v6i2.34858

2021-Publications

1. Badri Prasad Pangeni, Tanka NathDhamala (2021), A Brief Survey on Dynamic Network Flows in Continuous-time Model, Journal of Mathematical Sciences & Computational Mathematics, Vol 2 (4), 467-477(11), Society for Makers, Artists, Researchers and Technologists, DOI: https://doi.org/10.15864/jmscm.2401.
2. HariNandanNath, UrmilaPyakurel, Tanka NathDhamala, Stephan Dempe (2021), Dynamic Network Flow Location Models and Algorithms for Quickest Evacuation Planning, Journal of Industrial and Management Optimization (JIMO), 17(5): 2943-2970 doi: 10.3934/jimo.2020102.
3. Durga Prasad Khanal, UrmilaPyakurel and Tanka NathDhamala (2021), Maximum Multi-Commodity Flow With Intermediate Storage, Journal of Mathematical Problems in Engineering, Hindawi Publications, Volume 2021, Article ID 5063207, https://doi.org/10.1155/2021/5063207.
4. DipakBabuAmgain and Tanka NathDhamala (2021), Quckest Flow Algorithms with Time-varying Attributes, Journal of Institute of Science and Technology, Tribhuvan University, 26(1), 63-73, DOI: https://doi.org/10.3126/jist.v26i1.37826.
5. HariNandanNath, Stephan Dempe, Tanka NathDhamala (2021), A Bicriteria Approach for Saving a Path Maximizing Dynamic Contraflow, Asian Pacific Journal of Operational Research (APJOR), 2150027, DOI: 10.1142/S0217595921500275.
6. HariNandanNath, UrmilaPyakurel, Tanka NathDhamala, Network Reconfiguration with Orientation Dependent Transit Times, Journal of Mathematics and Mathematical Sciences, Hindawi, Volume 2021, Article ID 6613622, https://doi.org/10.1155/2021/6613622.
7. Shiva Prakash Gupta, UrmilaPyakurel and Tanka Nath Dhamala (2021), Generalized Dynamic Contraflow with Non-Symmetric Transit Times, American Journal of Computational and Applied Mathematics, Scientific & Academic Publishing, 11(1), 12-17, DOI: 10.5923/j.ajcam.20211101.02.
8. Shiva Prakash Gupta, UrmilaPyakurel and Tanka NathDhamala (2021), Network Flows with Arc Reversals and Non-Symmetric Transit Times, American Journal of Mathematics and Statistics 11(2), 27-33,\\ doi:10.5923/j.ajms.20211102.01
9. UrmilaPyakurel, Shiva Prakash Gupta, Durga Prasad Khanal, Tanka NathDhamala, Efficient Algorithms on Multi-Commodity Flow Over Time with Partial Lane Reversals, Journal of Mathematics and Mathematical Sciences, Hindawi, Volume 2020, Article ID 2676378, https://doi.org/10.1155/2020/2676378.
10. UrmilaPyakurel, Durga Prasad Khanal and Tanka NathDhamala (2021), Abstract Network Flow with Intermediate Storage for Evacuation Planning, European Journal of Operations Research (EJOR), https://doi.org/10.1016/j.ejor.2022.06.054
11. Durga Prasad Khanal, UrmilaPyakurel, Tanka NathDhamala and Stephan Dempe (2021), Efficient Algorithms for Abstract Flow with Partial Switching, Dynamics of Disaster (DOD), Special Issue at Operations Research Forum (accepted).

12. HariNandanNath, UrmilaPyakurel, Stephan Dempe and Tanka NathDhamala (2021) A Bilevel Programming Approach to Save a Path Maximizing the Dynamic Flow with Lane Reversals for Evacuation Planning, Journal of Bangladesh Mathematical Society (GANIT), 42(1), https://doi.org/10.3329/ganit.v42i1.60997
13. Azhar, OF, Naeem M, Mofarreh F, **Kafle J*** (2021) Numerical Analysis of the Fractional-Order Telegraph Equations, Journal of Function Spaces, 2314-8896. https://doi.org/10.1155/2021/2295804
14. Sunthrayuth P, Shah R, Zidan A. M., Kshan S, **Kafle J*** (2021) The Analysis of Fractional-Order Navier-Stokes Model Arising in the Unsteady Flow of a Viscous Fluid via Shehu Transform. Journal of Function Spaces, 2314-8896. https://doi.org/10.1155/2021/1029196
15. L Y-P, Shabbir K, Shahzeen S, Ali F, **Kafle J*** (2021) Extragradient Method for Fixed Points in CAT(0) Space. Journal of Function Spaces,.https://doi.org/10.1155/2021/7808255
16. Ullah R, Waseem M, Rosli NB, **Kafle J*** (2021) Analysis of COVID-19 Fractional Model Pertaining to the Atangana-Baleanu-Caputo Fractional Derivatives. Journal of Function Spaces. doi: 10.1155/2021/2643572
17. Tamilvanan K, Alanazi AM, Alshehri MG, **Kafle J*** (2021) Hyers-Ulam Stability of Quadratic Functional Equation Based on Fixed Point Technique in Banach Spaces and Non-Archimedean Banach Spaces. *Mathematics*, *9*, 2575. https://doi.org/10.3390/math9202575
18. Sunthrayuth P, Ullah R, Khan A, Shah R, **Kafle J***, Mahariq I, Jarad, F (2021) Numerical analysis of the fractional-order nonlinear system of VolterraIntegro-differential equations. Journal of Function Spaces. 2021, 1537958 https://doi.org/10.1155/2021/1537958
19. Sunthrayuth P, Ali F, AlderremyAA, Shah R, Aly S, Hamed YS, **Katle J*** (2021) The Numerical Investigation of Fractional-Order Zakharov–Kuznetsov Equations, *Complexity*, vol. 2021, Article ID 4570605, 13 pages. https://doi.org/10.1155/2021/4570605
20. Naeem M, Khammash AA, Mahariq I, Laouini G, **Kafle J*** (2021) Study of Fuzzy Fractional Nonlinear Equal Width Equation in the Sense of Novel Operator, *Journal of Function Spaces*, vol. 2021, Article ID 8387044, 12 pages, 2021. https://doi.org/10.1155/2021/8387044
21. IqbalN, Yasmin H, Rezaiguia A, **Kafle J***, Almatroud AO, Hassan TS (2021) Analysis of the Fractional-Order Kaup–Kupershmidt Equation via Novel Transforms, *Journal of Mathematics*, vol. 2021, Article ID 2567927, 13 pages, 2021. https://doi.org/10.1155/2021/2567927
22. Kandel HP, **Kafle J***, Bagale LP (2021) Numerical Modelling on the Influence of Source in the Heat Transformation: An Application in the Metal Heating for Blacksmithing. Journal of Nepal Physical Society, 7(2), 97-101. https://doi.org/10.3126/jnphyssoc.v7i2.38629
23. Asfaque M and **Kafle J*** (2021) Predicting Logarithm of Real Numbers to any Real Number Base. *Mathematics Education Forum Chitwan*, *6*(6), 95–101. https://doi.org/10.3126/mefc.v6i6.42412
24. B.H. Subedi. A comparison of classical holomorphic dynamics and holomorphic semigroup dynamics -I. *The Nep. Math. Sci. Report*, 38(2) (2021): 27-34. DOI: https://doi.org/0.3126/nmsr.v38i2.42707.
25. Santosh Ghimire, Shree Ram Khadka, Durga Jang KC (2021) Structure of Mathematical Research, Nepal Journal of Mathematical Sciences (NJMS), Vol. 2, No.2, DOI: https://doi.org/10.3126/njmathsci.v2i2.40130
26. Adhikari, K., Gautam, R., Pokharel, A., Uprety, K. N., Vaidya, N. K. (2021). Transmission dynamics of COVID-19 in Nepal: Mathematical model uncovering effective controls. *Journal of Theoretical Biology, 521*(07), 110680.
27. Adhikari, K., Gautam, R., Shrestha, D. B., & Pokharel, A. (2021). Transmission Dynamics of COVID-19 in Nepal. *Humanities and Social Sciences Journal, 521*(07), 155-169.

1. Shrestha, P., KC, D.J., and Sharma, R., On the Construction of Traveling Water Waves With Constant Vorticity and Infinite Boundary, International Journal of Mathematics and Mathematical Sciences, 2023, 1-6, 2022.
2. Shiva Prakash Gupta and Tanka NathDhamala (2022), An FPTAS for Quickest Multi-Commodity Contraflow Problem with Asymmetric Transit Times, Journal of Institute of Science and Technology (JIST).
3. Shiva Prakash Gupta, UrmilaPyakurel, Tanka NathDhamala (2022), Dynamic Multi-Commodity Contraflow Problem with Asymmetric Transit Times, Journal of Applied Mathematics, Hindawi Publications, Volume 2022, Article ID 3697141, https://doi.org/10.1155/2022/3697141.
4. Durga Prasad Khanal, UrmilaPyakurel, Tanka NathDhamala and Tanka NathDhamala, Maximum multi-commodity flow with proposal and flow dependent capacity sharing, Computer Sciences \& Mathematics Forum (2022) (IOCA, September 27 - October 10, 2021, Engineering Proceedings, MDPI 2021).
5. Iswar Mani Adhikari and Tanka NathDhamala, Quickest Transshipment in an evacuation network topology, Computer Sciences \& Mathematics Forum (2022) (The First Online Conference on Algorithms, IOCA, September 27 - October 10, 2021, Engineering Proceedings, MDPI 2021).
6. HariNandanNath, Tanka NathDhamala and Stephan Dempe, A bicriteria model for saving a path minimizing the time horizon of a dynamic contraflow, Computer Sciences \& Mathematics Forum (2022).
7. Arif F, Majeed Z, Rahman JU, Iqbal N, **Kafle J*** (2022) Mathematical Modeling and Numerical Simulation for the Outbreak of COVID-19 Involving Loss of Immunity and Quarantined Class, *Computational and Mathematical Methods in Medicine*, vol. 2022, Article ID 3816492, 21 pages, 2022. https://doi.org/10.1155/2022/3816492
8. Shah NA, El-Zahar ER, Akgül A, Khan A, **Kafle J*** (2022) Analysis of Fractional-Order Regularized Long-Wave Models via a Novel Transform, *Journal of Function Spaces*, vol. 2022, Article ID 2754507, 16 pages, 2022. https://doi.org/10.1155/2022/2754507
9. Aljahdaly NH, Akgül A, Shah R, Mahariq I, **Kafle J*** (2022) A Comparative Analysis of the Fractional-Order Coupled Korteweg–De Vries Equations with the Mittag–Leffler Law, *Journal of Mathematics*, vol. 2022, Article ID 8876149, 30 pages. https://doi.org/10.1155/2022/8876149
10. Sunthrayuth P, Jawarneh Y, Naeem M, Iqbal N, **Kafle J*** (2022) Some Sharp Results on Coefficient Estimate Problems for Four-Leaf-Type Bounded Turning Functions, *Journal of Function Spaces*, vol., Article ID 8356125, 10 pages, 2022. https://doi.org/10.1155/2022/8356125
11. Naeem M, Yasmin H, Shah NA, **Kafle J** (2022) Analytical approaches for approximate solution of the time-fractionalcoupled Schrödinger-KdV equation, *Symmetry,* 14, doi.org/10.3390/sym14122602
12. Pariyar S, **Kafle J*** (2022) Approximation Solutions for Solving Some SpecialFunctions of Fractional Calculus via Caputo-FabrizioSenseNepal Journal of Mathematical Sciences (NJMS), **3**(2), 2022, 71-80.
13. **Kafle J**, Pandey R, Dangol BR, Tiwari CN, Kattel P (2022) Influence of Friction Angles on Earth Pressures in Dry Granular Flow Dynamics and Soil Mechanics, The Nepali Math. Sc. Report. **39**.
14. B. H. Subedi. Completely invariant Fatou, Julia, and escaping sets of transcendental semigroups, Paper accepted for Thai Journal of Mathematics, Acceptance date: 28.01.2022, http://thaijmath.in.cmu.ac.th, ISSN 1686-0209.
15. B. H. Subedi. On the partition of fast escaping set of a transcendental entire function. *Journal of Institute of Science and Technology*, 27(1), 109-112 (2022). DOI: https://doi.org/10.3126/jist.v27i1.46683.
16. Ghimire JL, Pahari NP, Certain properties associated with Schauder frames in Banach spaces, Poincare Journals of Analysis and Applications, 9(2), 369-376 (2022).

17. Pahari NP, Kohli T, Ghimire JL Frame systems in non-locally convex Banach Spaces, Jodarn Journal of Mathematics and Statisties, 15(2), 231-242 (2022).
18. Ghimire JL, Pahari NP. On certain linear structures of orlicz space $c_0(M, ||.||)$ of vector valued difference sequences, The Nepali Mathematical Science Report, 39(2), 36-44 (2022).
19. Ghimire JL, Pahari NP, Onceratin type of difference sequence spaces defined by ϕ-function, Journal of Nepal Mathematical Society, 5(2), 11-17 (2022).
20. Sahani SK, Paudel GP, Ghimire JL, Thakur AK, On certain series to series transformation and analytic continuations by matrix methods, Nepal Journal of Mathematical Sciences, 3(1), 75-80 (2022).
21. Adhikari, K., Gautam, R., Pokharel, A., Dhimal, M. N., Uprety, K. N., & Vaidya, N. K. (2022). Insight into Delta variant dominated second wave of COVID-19 in Nepal. *Epidemics, 41*, 100642. doi:https://doi.org/10.1016/j.epidem.2022.100642
22. Gautam, R., Pokharel, A., Adhikari, K., Uprety, K. N., & Vaidya, N. K. (2022). Modeling malaria transmission in Nepal: impact of imported cases through cross-border mobility. *Journal of Biological Dynamics, 16*(1), 528-564.
23. Pokharel, A., Adhikari, K., Gautam, R., Uprety, K. N., & Vaidya, N. K. (2022). Modeling transmission dynamics of measles in Nepal and its control with monitored vaccination program. *Mathematical Biosciences and Engineering, 19*(8), 8554-8579.
24. Nepal TP, Adhikari B (2022) A Brief Survey on the Inverse Galois Problem', *Journal of Institute of Science and Technology*, Vol 27(1),11-17.
25. Nepal TP (2022) Some Application of Graph Theory & Network, *Journal of Emerging Technologies and Innovative Research (JETIR)*, Vol. 9(5).

Annex-VII: List of Equipment Procured in the FY 2079 by Central Department of Mathematics, TU

S.N	Particular	Quantity
1	Dispenser	1