UNIVERSIDAD DE MURCIA

FACULTY OF MATHEMATICS

Survival Models, Multivariate Extensions and Inference

Syllabus

Course code:	6380
Number of ECTS credits:	3
Semester:	1st (September-January)
Recommended components:	It is recommended the studying of the subject "Characterization, Classification and Ordering of Distributions" (6377).
Language of instruction:	Spanish (students are allowed to write homeworks and exams in English)

Course description

This subject presents students the basic knowledge of this area of research through the background and recent results related to the construction of survival models and some inferential topics. It is a complement to the Degree in Mathematics and a link with the Ph.D. in Mathematics.

Learning outcomes and competences

After completion of this course you will:

1. know and be able to apply the generating methods of multivariate survival models.
2. have the ability to apply and interpret survival models in various situations and scenarios.
3. know use the computer tools for simulation, estimation and fit of survival models.

Course contents

I. THEORY

1. Survival models and construction of multivariate extensions.
2. Competing risks models and complementary risks models.
3. Inferential issues and estimation algorithms.

II. COMPUTER PRACTISES

1. Simulation of survival models, multivariate extensions and applications.
2. Application of estimation algorithms of survival models.

References

Main texts

1. Balakrishnan, N.; Lai, C.D. (2009) Continuous bivariate distribution, 2nd ed. Springer, New York.

2. Beyersmann, J.; Allignol, A.; Schumacher, M. (2012) Competing Risks and Multistate Models with R. Springer, New York.

3. Crowder, M.J. (2012). Multivariate Survival Analysis and Competing Risks. CRC Press, Boca Raton FL.

4. Joe, H. (1997) Multivariate Models and Dependence Concepts. Chapman & Hall, London.

5. Kotz, S.; Balakrishnan, N.; Johnson, N.L. (2000) Continuous Multivariate Distributions. Wiley, New York.

6. Lai, C.D.; Xie, M. (2006) Stochastic Ageing and Dependence for Reliability. Springer, New York.

7. McLachlan, G.; Krishnan, T. (2008) The EM Algorithm and Extensions, 2nd ed. Wiley, New York.

8. Sarabia, J.M.; Gómez-Déniz, E. (2008) Construction of multivariate distributions: a review of some recent results. SORT, 32, 3-36.

Supplementary references

1. Domma, F. (2011) Bivariate Reversed Hazard Rate, Notions, and Measures of Dependence and their Relationships. Comm. Statist. Theory Methods, 40, 989-999.

2. Franco, M.; Kundu, D.; Vivo, J.M. (2011) Multivariate extension of the modified Sarhan-Balakrishnan bivariate distribution. J. Statist. Plan. Inference, 141, 3400-3412.

3. Franco, M.; Vivo, J.M. (2010) A multivariate extension of the Sarhan and Balakrishnans bivariate distribution and its ageing and dependence properties. J. Multivariate Anal., 101, 491-499.

4. Kundu, D.; Franco, M.; Vivo, J.M. (2014) Multivariate distributions with proportional reversed hazard marginals. Computational Statistics and Data Analysis, 77, 98-212.

5. Lai, C.D. (2004) Constructions of continuous bivariate distributions. J. Indian Soc. Probab. Statist., 8, 21-43.

6. Lai, C.D. (2006) Constructions of discrete bivariate distributions. In: Advances on Distribution Theory, Order Statistics and Inference, Birkhauser, Boston., N. Balakrishnan, E. Castillo, J.M. Sarabia Editors, 29-58.

7. Marshall, A.W.; Olkin, I. (1967) A multivariate exponential distribution. J. Amer. Stat. Assoc., 62, 30-44.

8. Sarhan, A.M.; Hamilton, D.C.; Smith, B.; Kundu, D. (2011) The bivariate generalized linear failure rate distribution and its multivariate extension. Computational Statistics and Data Analysis, 55, 644-654.