Systemic chemotherapy has become established as the standard treatment for advanced incurable gastric cancer. In the metastatic setting, systemic chemotherapy can prolong the survival time, improve symptom control and help to maintain a better quality of life. Testing the human epidermal growth factor receptor 2 (HER2) expression status of the primary tumor and/or metastases is warranted before initiation of first-line treatment. In cases of HER2 overexpression or amplified tumors, trastuzumab in combination with cisplatin and 5-fluorouracil (5-FU) or capecitabine are the standard forms of treatment. Tumors that are HER2 negative or weakly positive are treated with a platinum-fluoropyrimidine combination as doublet or as a triplet with docetaxel in younger patients who can tolerate more intensive treatment. Taxane derivatives, such as docetaxel and paclitaxel as well as irinotecan are accepted treatment options for patients who show progress during or after first-line chemotherapy. The anti-vascular endothelial growth factor receptor 2 (anti-VEGFR2) antibody ramucirumab demonstrated efficacy with prolongation of survival both as monotherapy and in combination with paclitaxel. This review article outlines the indications and clinical data for pharmaceutical treatment of advanced gastric cancer.